



new ways to meet changing requirements in energy conservation, government regulations, construction costs

Many owners, developers, specifiers and contractors have found that gypsum concrete roof decks help beat the performance-cost squeeze. These systems offer high-quality roof decks—at competitive prices—ideal for schools, shopping centers, industrial plants and other institutional and commercial buildings. Check these important benefits found in gypsum concrete roof decks:

- **low-cost noise control**
- **efficient thermal insulation**
- **improved fire protection**
- **lower insurance rates**
- **reduced construction costs**
- **high structural strength**
- **design versatility**
- **all-weather installation**

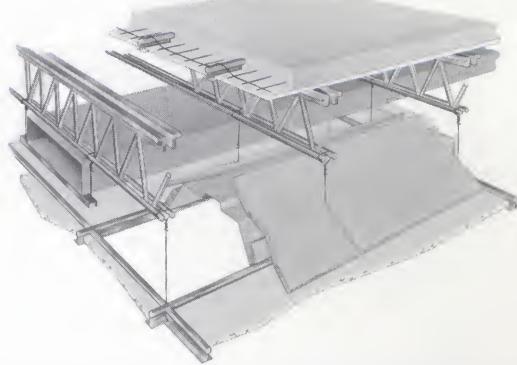
With these benefits, it's no wonder more gypsum decks are being installed than ever before—they offer *more value* than any other major deck system.

wider choice

U.S.G. offers 4 roof deck systems

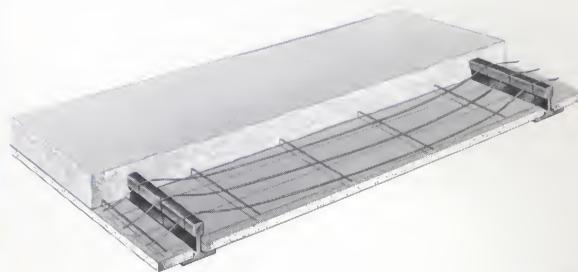
1. Fire-rated Gypsum Roof Decks of PYROFILL and THERMOFILL Gypsum Concrete are poured in place over galvanized reinforcing mesh and formboards supported by steel sub-purlins. Formboards are left exposed or a rated finished ceiling is suspended below. The result is a rock-hard, monolithic roof deck system that resists hurricane uplift wind forces up to 125 psf; has passed the UL Wind Uplift Class 90 test; resists seismic shock well in excess of building code requirements. Poured gypsum concrete takes any roof shape needed—flat, curved or pitched—to match function to form. Gypsum decks are rated noncombustible and their use dramatically reduces insurance rates for lifetime savings. Gypsum sets fast, so roofing can be applied without undue delay. These features make the systems ideal for schools, hospitals and other buildings where up to 2-hour fire resistance is required.

THERMOFILL has all the advantages of PYROFILL plus perlite aggregate that gives poured roof decks higher thermal insulation values with light weight.



2. Non-rated Gypsum Roof Decks are poured systems that offer most of the features of rated decks. They meet normal live and dead load requirements for roof purlin spacings up to 11 ft. where roof framing is steel, concrete or wood. With prestressed concrete structural elements spaced up to 16 ft., clear spans up to 100 ft. may be obtained.

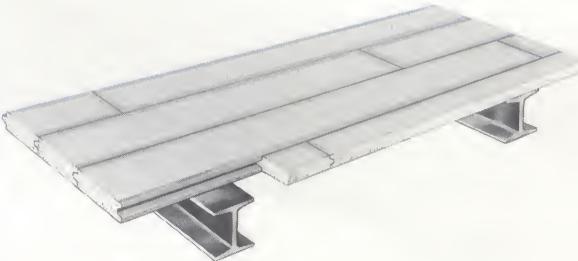
In wood-frame garden apartments, these decks satisfy fire code requirements without above-deck firewall extensions; permit drainage slopes to be formed in the slab instead of the framing; provide an excellent barrier to outside noise. See U.S.G. Folder IR-538 for details and specifications.



3. Drainage Slope Fills of quick-setting gypsum concrete are poured in place over structural roof decks of poured or pre-cast concrete or wood. They provide smooth, monolithic sloped surfaces that are easily roofed. Notably low in cost, these lightweight fills offer rapid installation even in cold and freezing weather.



4. USG Metal Edge Gypsum Plank, with a specially developed water-resistant core, is precast at the factory for installation in any weather on flat or steeply pitched roofs. This structural unit 2" thick, 15" wide and 10 ft. long, weighs approximately 13 psf and is reinforced with galvanized T&G edges and 16-ga. wire mat. Planks are quickly laid over steel, concrete or wood joists to form a noncombustible, structurally reinforced roof deck ready for roofing. For details, refer to U.S.G. System Folder SA-306 on Metal Edge Gypsum Plank.



limitations

1. Gypsum roof decks are suitable for normal temperature and humidity conditions. Acid fumes, generally not harmful to gypsum, may affect framing. Where such abnormal conditions prevail, consult U.S.G. for recommendations.

2. Certain recommendations concerning drying and ventilation, expansion and contraction, decorating and roofing must be adhered to for satisfactory performance (see Specifications, page 14 for details).

fire ratings

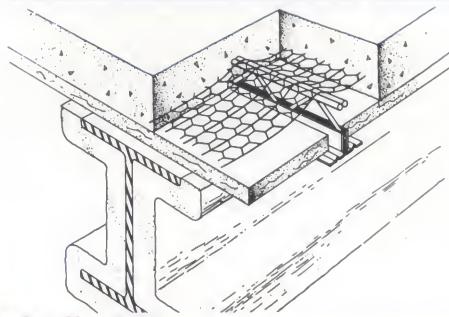
a choice of 2-hour fire-rated systems with exposed formboard or suspended acoustical ceilings

The U.L. tested U.S.G. roof deck systems listed below assure the extra protection required in a specific application. U.S.G.'s policy of comprehensive testing of complete roof deck systems offers not only a wide range of assemblies with 2-hour fire ratings, but high-quality roof decks designed to meet all of the nation's major building codes. Fire-rated gypsum decks also qualify for lower rates on principal types of insurance than insulated steel decks. Premium savings to owners can amount to as much as 55% annually.

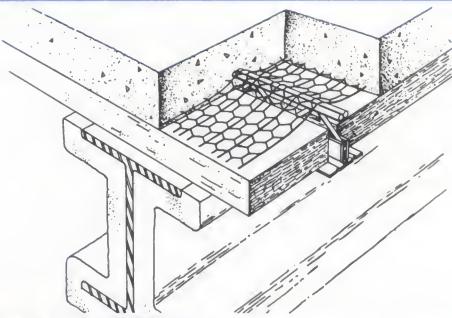
U.L. Design No. P676 (was RC-23—2 Hr.)

2-in. PYROFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on $\frac{1}{2}$ -in. exposed SHEETROCK or 1-in. FIRECODE Formboard supported by KEYDECK truss tees spaced $32\frac{3}{4}$ in. o.c. on fireproofed beams 8 ft. o.c. max. Slab weight: 11 psf.

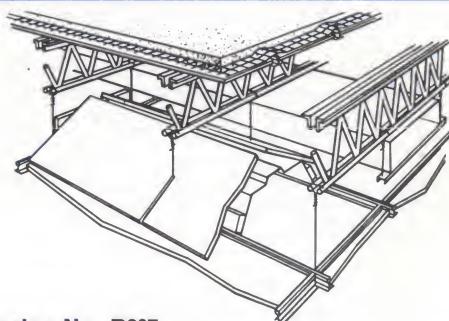
Gypsum Concrete Roof Systems



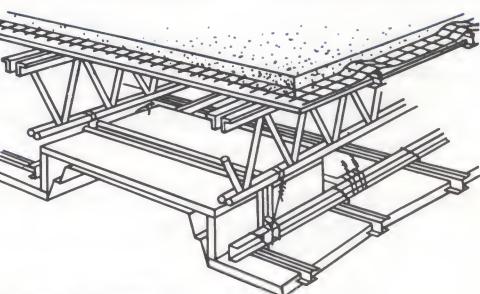
U.L. Design No. P676



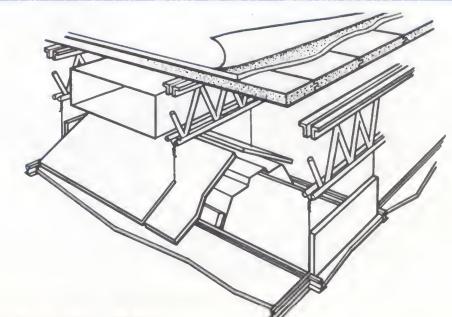
U.L. Design No. P677



U.L. Design No. P207



U.L. Design No. P002



U.L. Design No. P213

U.L. Design No. P677 (was RC-15—2 Hr.)

2-in. THERMOFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on 1 to $1\frac{1}{2}$ -in. exposed FIRECODE Formboard or $\frac{1}{2}$ -in. SHEETROCK Formboard supported by KEYDECK truss tees spaced $32\frac{3}{4}$ in. o.c. on fireproofed beams spaced 7 ft. o.c. max. Slab weight: 8 psf.

U.L. Design No. P207 (was RC-6—2 Hr.)

2-in. PYROFILL Poured Gypsum Concrete reinforced with KEYDECK wire mesh on $\frac{1}{2}$ -in. SHEETROCK or 1-in. FIRECODE Formboard supported by USG Sub-purlin 20 or KEYDECK bulb tees spaced 32-in. o.c. and welded to 12-in. steel bar joist 4 ft. o.c. max. and AURATONE FIRECODE or AIRSON AURATONE FIRECODE Acoustical Panels suspended on an exposed rated grid system. Slab weight: 11 psf.

U.L. Design No. P002 (was RC-13—2 Hr.)

2-in. THERMOFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on $\frac{1}{2}$ -in. SHEETROCK or 1-in. FIRECODE Formboard supported by USG Sub-purlin 20 or KEYDECK bulb tees spaced $32\frac{3}{4}$ in. o.c. and welded to 10-in. steel bar joist spaced 4 ft. o.c. max. and AURATONE FIRECODE or AIRSON AURATONE FIRECODE Acoustical Tile suspended on a standard concealed Z-spline system. Slab weight: 8.2 psf.

U.L. Design No. P213 (was RC-22—2 Hr.)

USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 7 ft. o.c., $\frac{3}{4}$ -in. noncombustible roof insulation, light fixtures and air dampers, AURATONE FIRECODE Ceiling Panels on an exposed rated grid system. Plank weight: 13 psf.

U.L. Design No. P501

USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 4 ft. o.c., $\frac{3}{4}$ -in. noncombustible roof insulation, USG Metal Furring Channels 24 in. o.c. wire-tied to joists, $\frac{5}{8}$ -in. SHEETROCK FIRECODE "C" Gypsum Panels screw-attached to channels, joints unfinished or taped. Plank weight: 13 psf.

design versatility

in the roof deck . . .

U.S.G. gypsum concrete can be shaped to virtually any roof configuration—curves, pitches, sawtooth angles or flat. It provides the adaptability needed to design buildings of distinctive appearance with no sacrifice of construction efficiency.

A free Computer Design Comparison Service is available to provide optimum bar joist spacing. This service may reduce in-place costs of deck and joists from 6¢ to 10¢ psf, still obtaining lowest insurance rates (see Specifications, page 15).

over the deck . . .

Gypsum concrete simplifies building design and permits use of constant height columns and level decks. Slopes for drainage are readily screeded over concrete, wood or insulated decks.

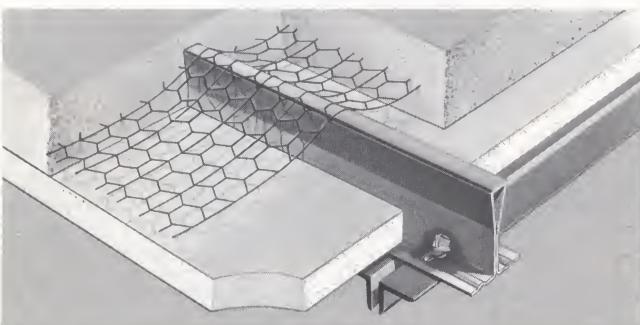
A certification program assures that PYROFILL or THERMOFILL Gypsum Concrete meets or exceeds industry standards for dry density and compressive strength (see page 15).

PYROFILL Gypsum Concrete is mill-formulated and composed of calcined gypsum and wood chips or shavings. It is mixed with clean water, only, at the job site and poured-in-place over permanent formboards or other decks as a drainage fill. Thermal resistance (R) value is 0.67 per inch. PYROFILL complies with ANSI A59.1-1968 and ASTM C317-64 (1970) Standards.

THERMOFILL Gypsum Concrete is mill-formulated and composed of calcined gypsum and graded perlite aggregate. It is mixed with clean water, only, at the job site and poured-in-place over permanent formboards. Thermal resistance (R) value is 0.87 per inch. THERMOFILL complies with ANSI A59.1-1968 and ASTM C317-64 (1970) Standards. Not available north of 40th Parallel from Oct. 1 to April 1, except for use as drainage slope fill.

Steel sub-purlins vary in size, weight and shape and are selected according to required span and loading. They provide lateral bracing, anchorage against uplift, and restrict deck movement due to temperature change. Sub-purlin spacing accommodates 24", 32", or 48" formboard widths with a slight tolerance for ease of formboard placement. Sub-purlins are spaced approx. 24 $\frac{1}{8}$ ", 32 $\frac{1}{8}$ ", or 48 $\frac{1}{8}$ " o.c. and are welded to the structural framing members. When 48" wide formboard is used with light sub-purlin sections, supporting steel spacing should not exceed 36" o.c.

USG Steel Sub-purlins are roll-formed from 16-ga., 18-ga. and 20-ga. hot-dipped galvanized metal. An exclusive light-weight design provides low in-place costs for bar joists spac-



Cost-saving USG Sub-purlin is ideal for short spans; quick one-weld installation resists uplift.

ings up to 6'0" (see table, page 9). They offer necessary roof support over short spans for any U.S.G. poured gypsum concrete roof deck. Assemblies using USG Sub-purlins qualify for 2-hour UL fire rating (UL Designs P207 and P002).

USG Sub-purlins anchor the slab against uplift forces and supply strong lateral bracing. Galvanized finish requires no painting. Quick one-weld installation eliminates usual double welds at sub-purlin ends and affords uplift resistance up to 500 lbs. with $\frac{3}{8}$ " weld through web and flanges to framing.

Other sub-purlins, neither manufactured nor sold by U.S.G., are available for heavier loads and longer spans (see page 9).

Reinforcing mesh for PYROFILL is one of following types:

1. **KEYDECK**—A galvanized wire mesh, woven with 16-ga. straight wires and 19-ga. diagonal wires.
2. **48-1214**—A galvanized, welded wire mesh with 12-ga. longitudinal wires at 4" o.c. and 14-ga. transverse wires at 8" o.c.

The effective cross-sectional area of reinforcing mesh placed at 90° to the sub-purlins is .026 sq. in. per foot of mesh width. U.S.G. neither manufactures nor sells reinforcing mesh.

in the formboards . . . concealed or exposed

Four U.S.G. Formboards offer complete freedom of design. They are used singly or in combination to provide insulation, fire protection, moisture resistance, pleasing appearance, economy of installation, or sound control. They serve both as a formboard for the poured gypsum concrete and, when needed, as semi-finished ceilings eliminating costs of additional ceiling material. Their superior fire protection makes added fireproofing materials unnecessary and often reduces insurance costs.

SHEETROCK Formboard is a rigid gypsum board, treated to resist mildew effectively where adequate ventilation is provided. Two-hour fire ratings and 46 STC are available with 2" gypsum slabs and exposed tees. Ideal for almost every roof deck need, concealed or exposed. Makes economical ceilings for warehouses, light manufacturing buildings, schools—any construction where durability and low cost are desired.

FIRECODE Formboard is a rigid, highly insulative board suitable for 2-hour fire-rated construction. The mineral fibers will not contribute to mildew growth. Reduces reflected noise—provides performance up to 50 NRC (see table at right). Available in two types:

Custom has a white factory-applied finish; used for high ceilings that require a semi-finished surface with built-in acoustical properties and good light reflectance.

Economy has a natural matte surface with a medium tan color. Ideal for concealed areas where a ceiling will be suspended below the deck or where ceiling appearance is not an important factor.

Asbestos Cement Formboard is a rigid, industrial type board that provides more resistance to heat and humidity than other formboards. Ideal for use on exterior soffits and above heat-producing machinery where temperatures at the board are less than 125° F.

noise control

built-in acoustical performance to help meet OSHA standards

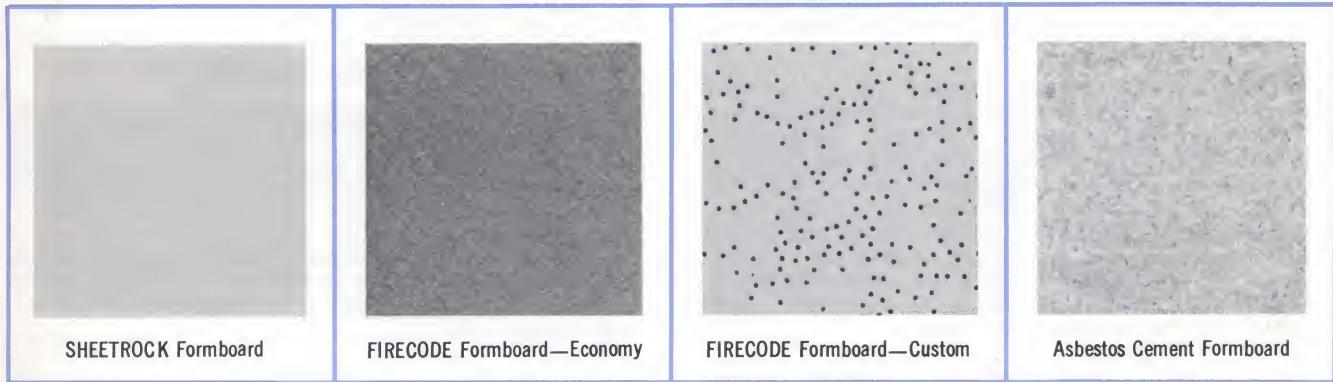
As a result of the Occupational Safety and Health Act of 1970, plant management is faced with the choice of maintaining noise levels within specified ranges, or limiting the duration of employees' exposure to high noise levels. Since reduced exposure has the effect of increasing production costs, every effort should be made in new plant design to limit noise levels.

Another regulation requires all plants with Federal contracts over \$10,000 to eliminate continuous noise over 90 dBA where workers are present.

U.S.G. roof deck systems with gypsum concrete poured over exposed glass-fiber formboard offer the most economical method of incorporating a large sound-absorbent surface in new plant construction. The glass-fiber formboards effectively absorb sound and reduce reverberation. Interior noise levels can be reduced up to 7 db with these formboards, which offer .75 to .95 NRC. Glass-fiber formboards are not manufactured by U.S.G.

Exterior noise is efficiently attenuated by the high sound transmission loss of the gypsum deck. PYROFILL Gypsum Concrete, poured 2½" thick over SHEETROCK Formboard, developed STC 46, three points higher than the best-rated steel deck system, as tested by Riverbank Acoustical Laboratories. See U.S.G. brochure IR-548 for complete design data on noise control with U.S.G. roof deck systems.

U.S.G. formboards



Gypsum Concrete Roof Systems

SA

305



Gypsum decks help designers comply with OSHA requirements. They effectively control outside noise and absorb noise created by equipment. Light-reflective U.S.G. formboards lower plant illumination and maintenance costs.

formboard characteristics

type	SHEETROCK formboard	FIRECODE mineral fiber formboard				asbestos formboard
		custom	economy			
thickness	½"	1"	¾"	1"	1½", 1¾", 2"	¼"
width	32"	32" & 24"	24"	32" & 24"	32" & 24"	32"
length	up to 12' max.	4' to 6'8"	4' to 6'8"	4' to 6'8"	4' to 8'	48"
weight/sq. ft.	2.025	1.65	1.05	1.40	2.15, 2.50, 2.85	2.4
R-value	0.45	3.70	2.78	3.70	5.55, 6.48, 7.40	0.06
flame spread	15-20(1)	5-10(2)		0-5(2)		0-5
noise reduction coefficient	—	.50		.40		—
light reflection coefficient	66%	65%		—		40%
specification compliance	ASTM C318-67 C472-70	Federal Spec. SS-L-30D Type V	Federal Spec. SS-S-118a Class 25 (noncombustible)	Federal Spec. SS-S-118a Class 25 (noncombustible)		Federal Spec. SS-B-755a Type U

(1) Flame spread ratings determined by Underwriters Laboratories testing. (2) Flame spread rating determined by Southwest Research Institute.

structural strength

to withstand hurricane winds, wind uplift and roof loads . . .

U.S.G. roof deck systems form a monolithic unit that structurally integrates the roof deck with the roof framing. The roof deck is a rigid diaphragm that provides firm resistance to harmonic wave action (as uplift is applied and relaxed).

Gypsum concrete decks have high structural strength and a hard surface. In tests, standard assemblies supported uniform roof loads over 450 psf when wet and 700 psf when dry. At dry densities of 48 to 50pcf for PYROFILL and 38 to 40pcf for THERMOFILL, the compressive strength of the slab is 500 psi min. This conforms to ANSI A59.1-1968 and ASTM C317-64 for Class A gypsum concrete; exceeds the strength of other insulating fills; provides a better base for roofing and adequate support for normal roofing equipment.

U.S.G. roof decks with long, clear spans require fewer bar joists than steel decks to resist this action which can cause damage to roof coverage and deck. To provide the necessary protection for Types A and B steel decks, the new Factory Mutual Specification 1-28 for Class I Construction, requires added bar joists—also more roof insulation to resist damage to deck caused by foot traffic. Safety factors are also designed into gypsum roof deck components, so they don't have to be added later when cost is greater.

In **hurricane areas**, such as Florida, standard gypsum roof decks have withstood as many as five fierce blows without damage. This is because U.S.G. roof decks resist uplift action by nearly four times the normal requirements of 35 psf when constructed with bulb or truss tee sub-purlins welded to the primary framing.

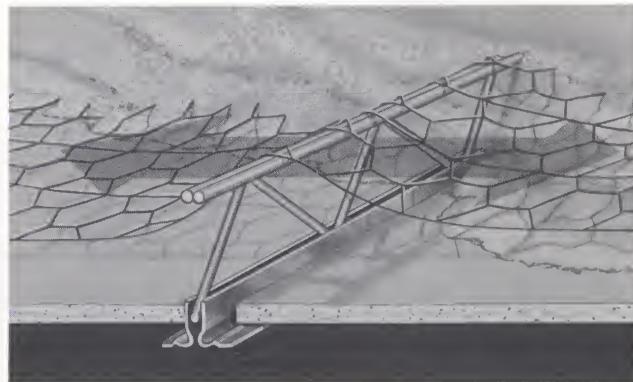
UL Wind Uplift Class 90 has been assigned to a poured gypsum concrete roof deck assembly based on qualified testing. The system tested consisted of PYROFILL Gypsum Concrete over SHEETROCK Formboard with bulb tees, KEYDECK mesh and roof covering attached with NAIL-TITE nails. This U.S.G. assembly successfully withstood the rigorous test—while conventional 22-, 20- and 18-ga. steel and lightweight concrete roof deck systems have not. Extended coverage insurance rates are generally lower for assemblies having passed the test, especially in Gulf Coast and Prairie States where high wind velocities are prevalent.



to resist seismic shock or to reinforce the building . . .

U.S.G. roof decks provide excellent lateral bracing. They have withstood some of the most severe earthquakes in California and have been approved as rigid diaphragms in Los Angeles and in many of the 1,000 cities which use the Uniform Building Code.

U.S.G. poured gypsum roof decks with bulb tees or truss tees structurally tie the framing system together to reinforce the building and provide resistance to wind and seismic loads—*without extra cost*.



All roof decks are subject to uplift forces and must be anchored to supports to resist this uplift. Although dead load can be considered as part of the total resistance, the chief resistance is obtained by securely welding the sub-purlin to the main purlin at bearing points to transmit slab loads. The reinforcing mesh also absorbs tensile stress, distributes it across the slab, and transmits it to the framing.

The open web construction allows the gypsum fill to flow through the truss tee so it is embedded in a solid mass of gypsum concrete. This, plus the welding of the truss tee to the supports, provides a strong composite resistance to shear and uplift. Cracking and deflection caused by impact and seismic shock are minimized.

U.S.G. gives more for less... in fire-rated systems

Initial savings can amount to thousands of dollars in construction investment when U.S.G. fire-rated roof decks are specified. A UL 2-hour fire-rated system often costs only 5¢ psf more than a non-rated system . . . up to 60¢ less than other types of 2-hour UL fire-rated decks. U.S.G. decks enjoy ready acceptance from major code bodies and insurance companies.

in non-rated systems

Savings are achieved through the unique advantages U.S.G. roof decks offer in strength, fire protection and durability. Savings also occur through low "U" values which reduce costs of air-conditioning and electrical heating; and through highly light-reflective U.S.G. formboards which can lower illumination costs. Both these features offer positive measures to conserve energy fuel—to keep their costs from rising—and operating costs from spiraling.

in fast installation

Up to 30,000 sq. ft. of gypsum deck can be poured in one day. The quick-setting action of gypsum concrete permits roofing almost immediately. There's no wait for curing as with ordinary lightweight concrete decks; no costly delays in erection schedules.

U.S.G. roof decks can be poured in cold weather; in any weather in which men can work. The quick-setting action of gypsum concrete makes it one of the best roof deck materials for winter construction. The exothermic reaction in the slab protects it from freezing before set takes place and the slab is capable of carrying design loads.

in reduced construction costs

U.S.G. gypsum roof decks meet Factory Mutual Noncombustible Classification to qualify for lowest extended-coverage insurance rates without the clear-span limitations imposed upon steel roof deck designs. With gypsum decks, bar joist spacing can be optimized for major cost reductions over steel and lightweight concrete deck systems.

U.S.G.'s free Computer Design Comparison Service quickly supplies computer solutions to construction designs; considers components such as sub-purlins, beams, roof girders, tie-beams—almost everything except columns. Data supplied optimizes bar joist or steel beam designs with poured gypsum roof decks to reduce in-place costs and obtain lowest insurance rates. Job savings of 8¢ to 12¢ psf in bar joist steel alone have been realized.

in insurance savings

value	80% co-insurance	2-hour gypsum roof deck rate per \$100	steel roof deck rate per \$100	difference per \$100	annual premium savings
property damage insurance (300,000 sq. ft. area—sprinklered)					
building	\$3,000,000	80%	\$0.08	\$0.177	\$0.097
contents	\$4,000,000	80%	\$0.08	\$0.177	\$0.097
					\$3,104
					total fire and extended coverage premium savings
					\$5,432
business interruption insurance (\$2,000,000 annual value at 80% of building fire insurance rate)					
	\$2,000,000 x 0.80 x .097/\$100				\$1,552
					total annual insurance premium savings
					\$6,984

Gypsum Concrete Roof Systems



Building owners can save up to 55% annually on Property Damage and Business Interruption Insurance when U.S.G. Poured Gypsum Concrete Deck Systems are specified instead of steel deck assemblies, according to a recent study by the National Loss Control Service Corp. This firm developed rate comparisons for gypsum and steel roof decks in five areas of the U.S.A. for shopping centers, manufacturing plants and warehouses both with and without automatic sprinkler protection (details available on request). The comparison at left below shows almost \$7,000 annual savings for a typical sprinklered industrial plant near Chicago. For the same unsprinklered building the annual savings are over \$22,000.

in total value

U.S.G. gypsum roof decks are the best value in the industry. They offer maximum economy without sacrificing safety or strength. They resist rot, warpage, and deterioration to cut maintenance costs. They can also reduce continued operating costs such as heating, air conditioning and insurance.

Here's proof U.S.G. roof decks offer more

	steel	mineralized wood fiber	lightweight concrete	PYROFILL poured gypsum
UL-rated assembly	P409 2-hour rating	P403 2-hour rating	P215 2-hour rating	P207 2-hour rating†
approx. cost/deck & ceiling only	\$1.75 p.s.f.	\$1.75 p.s.f.	\$1.40 p.s.f.	\$1.15(1), \$1.25(2) p.s.f.
acoustical properties	minimal (plaster)	minimal (plaster)	NRC .60 to .70	NRC .60 to .70
light reflectance	determined by finish applied	determined by painting	85%—Class A	85%—Class A
year-round construction	yes	yes	only above 40° F.	yes
ceiling	brown coat plaster	finished plaster	½-in. gypsum board over ½-in. ceramic acoustical tile	¾" AURATONE FIRECODE acoustical ceiling panels††
lateral restraint lbs./l.f.	300	400	670	1060 KEYDECK mesh, 840 1214 mesh
wind uplift UL Class 90	no	yes	no	yes
insulation U-factor deck & ceiling	.21	.21	.13	.18(1), .11(2)
ceiling flexibility accessibility	none unless access panels installed	none unless access panels installed	fully accessible	fully accessible

†Possible extended-coverage insurance advantage
(1) with SHEETROCK Formboard (2) with 1" FIRECODE Formboard

††5 different patterns

thermal insulation

to reduce cooling-heating expense

U.S.G. roof decks offer low "U" factors to hold down installation costs as well as operating expense of air conditioning and electrical heating. A standard 3-in. deck of PYROFILL Concrete over FIRECODE Formboard provides as much thermal insulation as a steel deck with 1½-in. rigid insulation. Needed

resistance to heat transmission can often be obtained without additional insulation. The tables below show design insulation values for various U.S.G. roof deck-ceiling combinations and for roof deck systems with exposed formboards.

design weight and insulation—"U" values (1) (for fire-rated and non-rated decks)

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn.-in.	"U" values—exposed formboard	"U" values—% AURATONE Panels or Tile(4)		
				no added insul.	plus 2" insul. blankets	plus 3" insul. blankets
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.34	.18	.08	.06
		½	.23	.14	.07	.06
		1	.18	.12	.06	.05
		1½	.14	.10	.06	.05
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.16	.11	.06	.05
		½	.13	.10	.06	.05
		1	.11	.09	.05	.04
		1½	.10	.08	.05	.04
2¼" PYROFILL Gypsum Concrete ¼" Asbestos-Cement Formboard	12	0	.37	—	—	—
		½	.25	—	—	—
		1	.18	—	—	—
		1½	.15	—	—	—
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.30	.17	.07	.06
		½	.21	.13	.07	.05
		1	.16	.11	.06	.05
		1½	.13	.10	.06	.05
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.15	.11	.06	.05
		½	.13	.09	.06	.05
		1	.11	.08	.05	.04
		1½	.09	.07	.05	.04

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn.-in.	"U" values—¾" ACOUSTONE Tile or Panels(5)			"U" values—½" SHEETROCK Gypsum Panels(6)			
			"F"	"db"(1)	"db"(2)	Regular	Foil-Back (1)	Foil-Back (2)	plus Acoustical Tile(6)
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.17	.13	.07	.24	.16	.07	.16
		½	.14	.11	.06	.18	.13	.07	.13
		1	.12	.09	.06	.14	.11	.06	.11
		1½	.10	.08	.05	.12	.10	.06	.10
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.11	.09	.05	.13	.11	.06	.10
		½	.10	.08	.05	.11	.09	.05	.09
		1	.09	.07	.05	.10	.08	.05	.08
		1½	.08	.07	.04	.09	.07	.05	.07
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.16	.12	.06	.22	.15	.07	.15
		½	.13	.10	.06	.17	.12	.06	.12
		1	.11	.09	.05	.14	.11	.06	.11
		1½	.10	.08	.05	.11	.09	.05	.09
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.10	.09	.05	.13	.10	.06	.10
		½	.09	.08	.05	.11	.09	.05	.09
		1	.08	.07	.05	.09	.08	.05	.08
		1½	.07	.06	.04	.08	.07	.05	.07

(1) Btu/sq. ft./hr./deg. F temp. diff. (includes built-up roofing); for winter conditions—heat flow up, except as noted; (2) summer conditions—heat flow down. (3) Weight of sub-purlin or roofing not included. PYROFILL density: 50 lb. per cu. ft., THERMOFILL density: 39 lb. per cu. ft. (4) Mechanically suspended. (5) Furred suspended. (6) With ¾" ACOUSTONE "F" Tile adhesively applied.

thermal insulation—"U" values (1) (for 2" gypsum concrete over FIRECODE Formboard)

deck system		no insulation		1" insulation		no insulation—% AURATONE Panels or Tile Ceiling (2)	
type of fill	formboard thickness (3)	winter	summer	winter	summer	winter	summer
2" PYROFILL Gypsum Concrete	¾"	.19	.18	.12	.12	.13	.12
	1"	.16	.15	.11	.11	.11	.11
	1½"	.13	.12	.09	.09	.09	.09
	1¼"	.11	.11	.09	.08	.09	.08
	2"	.10	.10	.08	.08	.08	.08
2" THERMOFILL Gypsum Concrete	¾"	.18	.17	.12	.11	.12	.11
	1"	.15	.14	.11	.10	.11	.10
	1½"	.12	.11	.09	.09	.09	.09
	1¼"	.11	.10	.08	.08	.08	.08
	2"	.10	.09	.08	.07	.08	.07

(1) Cross tees required for other than purlin lengths. (2) Suspended ceiling and vented space. (3) Sub-purlins should extend min. of ¼" above the top surface of formboard.

design data

SA

305

Gypsum Concrete Roof Systems

bulb tee sub-purlins

sub-purlin		total safe uniform load—psf													max. eave overhang	
type	wt.-lbs./lin. ft.	span														
		5'0"	5'6"	6'0"	6'6"	6'8"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"	10'6"		
112	1.40	67	56	47	40										2'2"	
158	1.60	92	76	64	54	52	47								2'9"	
168	1.75	109	91	78	74	67	58								3'4"	
178	2.05		119	101	95		87	76	66	59	52				3'11"	
218	3.00						119	103	91	80	72	64	58	52	4'10"	
228	3.65							129	114	102	91	82	74	68	5'10"	

Loads based on 3-span condition and 39,600 psi design stress for 112, 158, 168, 178 tees and 33,000 psi for others. Loads are for bulb tee acting alone, live-load deflection L/240 or less and 32% spacing; for 24% spacing, multiply by 1.32. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24% tee spacing, .37 for 32% spacing and .25 for 48% spacing.

truss tee sub-purlins

sub-purlin		total safe uniform load—psf													max. eave overhang	
type	wt.-lbs./lin. ft.	span														
		5'0"	5'6"	6'0"	6'6"	6'8"	7'0"	7'6"	7'0"	8'6"	9'0"	9'6"	10'0"	10'6"		
5-6-17-1½	0.96	65	54	45											2'6"	
5-6-17-2	0.96	76	63	53	45	43	39								2'9"	
2-5-17-2	1.12	119	90	82	70	67	61	53	46	41					3'5"	
2-3-17-2½	1.19			107	91	86	78	68	60	53	47	43				
1-5-17-2	1.26	129	107	90	76	73	66	57	50	45	40				3'7"	
1-3-17-2½	1.32			116	98	94	85	74	65	58	52	46	42			
000-5-14-2	1.78						89	77	68	60	54	48	43	39	4'1"	
000-3-14-2½	1.85							101	89	78	70	63	57	51	47	

Loads based on 3-span condition, truss tee acting alone, live-load deflection L/240 or less and 32% spacing. For 24% spacing, multiply by 1.32; for 2-span condition, multiply by .8; for single span condition, multiply by .72. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24% tee spacing, .37 for 32% spacing and .25 for 48% spacing.

USG sub-purlin

type	wt.-lbs./lin. ft.	total safe uniform load-psf for poured gypsum decks					max. eave overhang	
		span						
		4'0"	4'6"	5'0"	5'6"	6'0"		
20-ga.	0.73	117	93				2'5"	
18-ga.	0.95	140	111	90	74		2'8"	
16-ga.	1.1	153	121	98	81	68	3'0"	

Loads are for sub-purlin composite construction and based on continuous span condition, deflection L/240 or less and 32% o.c. spacing. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by sub-purlins, calculate overhang separately.

type	wt.-lbs./lin. ft.	sub-purlin spacing	total safe uniform load-psf for precast roof deck units				max. eave overhang	
			span					
			4'0"	4'6"	5'0"	5'6"		
20-ga.	0.73	24"	38	30				
18-ga.	0.95	24"	55	43	35			
		32"	41	33				
16-ga.	1.1	24"	68	54	44	36		
		32"	51	41	33			

Loads based on 3-span condition and bending stress; deflection less than L/240. Subtract weight of deck unit and roof covering to find live-load capacity.

nail-holding power*

description of nail	PYROFILL gypsum concrete			THERMOFILL gypsum concrete		
	removal -1 day	removal -7 days	removal -slab dry	removal -1 day	removal -7 days	removal -slab dry
1½" ES NAIL-TITE (A)—plain finish (1¼" penetration)	67†	77	136	60†	67	141

*Resistance to direct pull in lbs., for nails placed 24 hrs. after pouring slab. Test slabs had 2" min. thickness and dry density of 48 pcf for PYROFILL and 38 pcf for THERMOFILL. Nail-holding power decreased at densities less than those cited.

(A) Manufactured by E. S. Products, New Rochelle, N.Y., and recommended for smooth coat type roofing.

†Provides min. 40 lbs. immediate holding power required by roofing manufacturers.

physical properties (dimensions in inches)			
USG and bulb tees			
type	B	C	D
USG	2¹/₄	1½	1¾
112	³/₈	1½	1½
158	³/₈	1⅓	1⅓
168	⁷/₁₆	1½	2
178	⁹/₁₆	1⁵/₈	2
218	¹¹/₁₆	2¹/₂	2¹/₈
228	⁷/₈	2¹/₁₆	2¹/₆

truss tee

type	B	D	chord wire gage
5-6-17-1½	⁹/₁₆	1¼	5
5-6-17-2	⁹/₁₆	2	5
2-5-17-2	²¹/₃₂	2	2
2-3-17-2½	²³/₃₂	2½	2
1-5-17-2	²³/₃₂	2	1
1-3-17-2½	³/₄	2½	1
000-5-14-2	⁷/₈	2	000
000-3-14-2½	²⁹/₃₂	2½	000

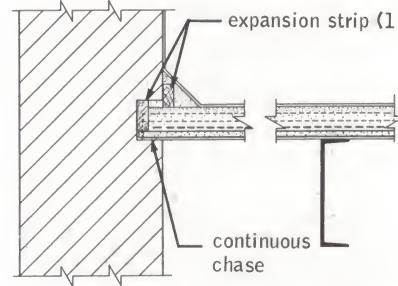
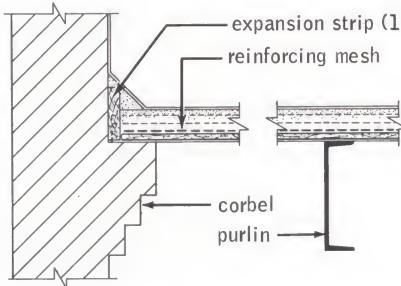
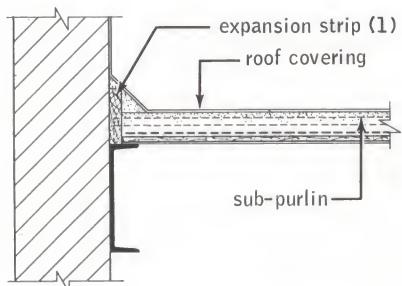
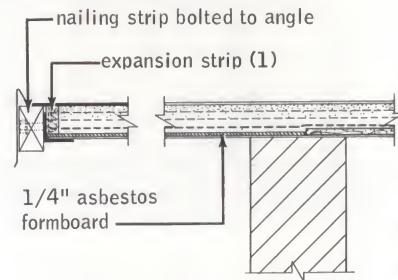
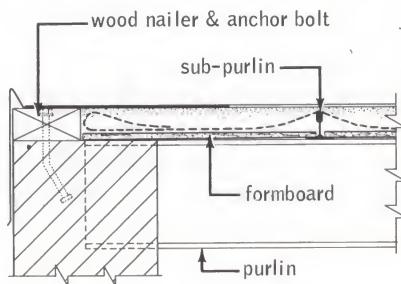
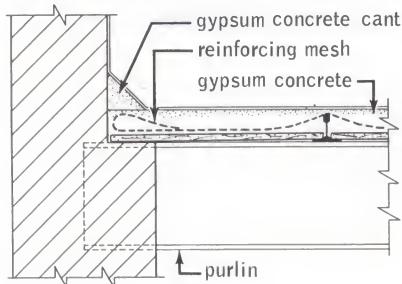
Properties shown are taken from data furnished by manufacturer.

details

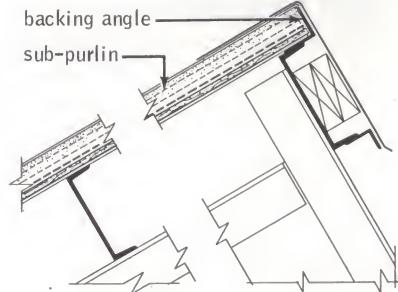
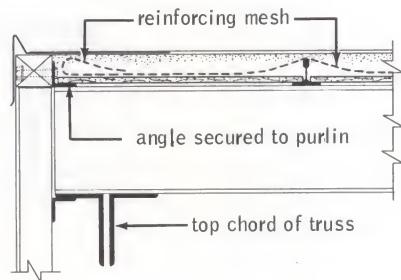
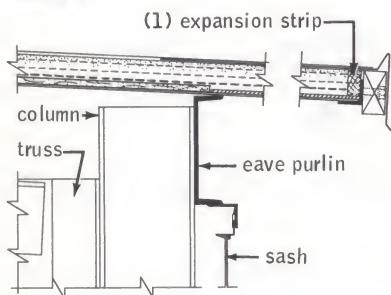
scale: $\frac{3}{4}'' = 1'-0''$

application over beams and bar joists

wall details

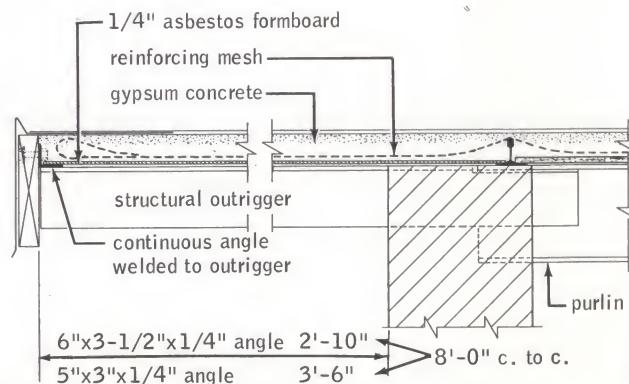
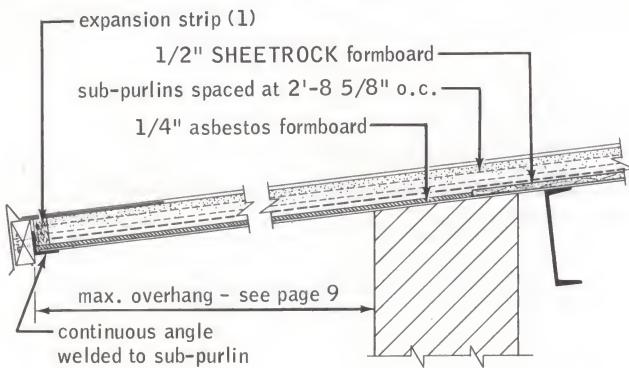


eaves



eave & gable overhang

(overhang based on 45#/ft' total load)



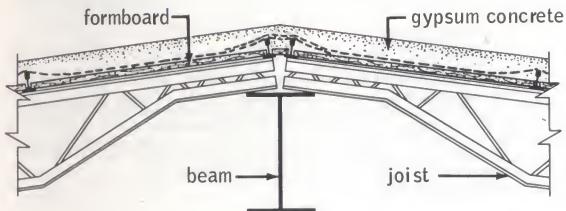
(1) Expansion strips are not recommended for seismic Approved Diaphragm design. See page 12 for Seismic Detail.

details

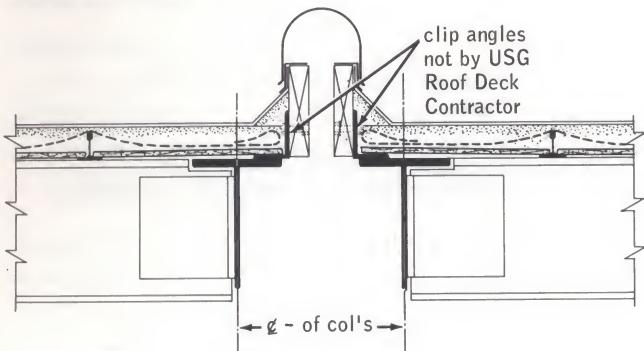
scale: $\frac{1}{4}'' = 1'-0''$

application over beams and bar joists

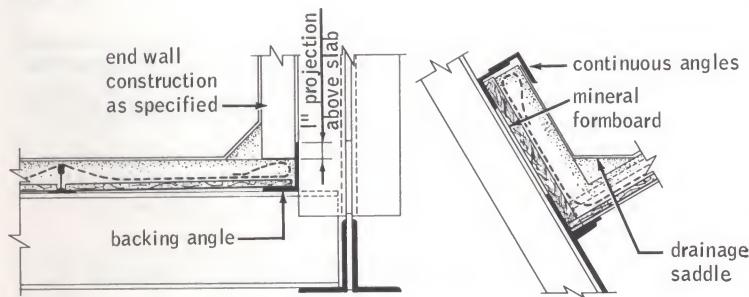
ridge detail



expansion joint

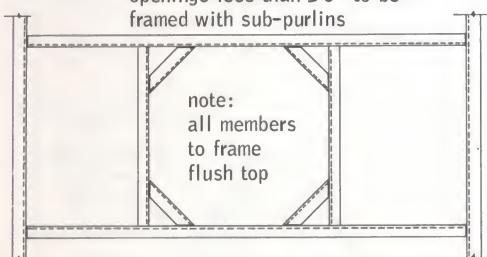


curbs



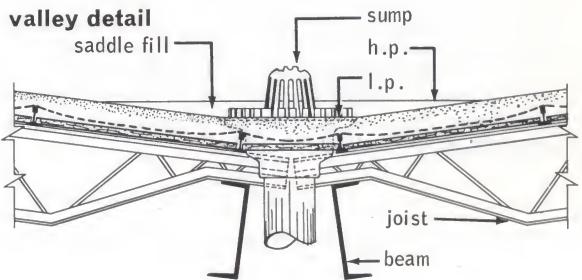
typical framing around openings larger than 30"

openings less than 30" to be framed with sub-purlins

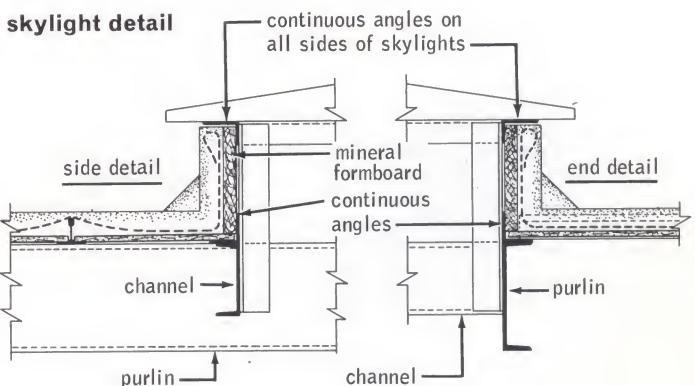


Note: all miscellaneous structural steel, such as channels, wood nailers, angles, hangers and channel grillage, attached to roof framing, are not by USG Roof Deck Contractor.

Gypsum Concrete Roof Systems

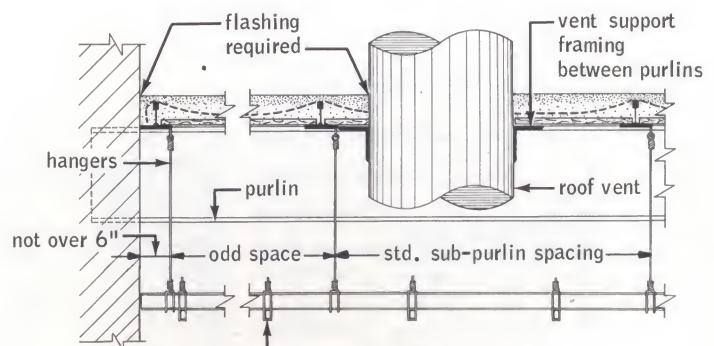
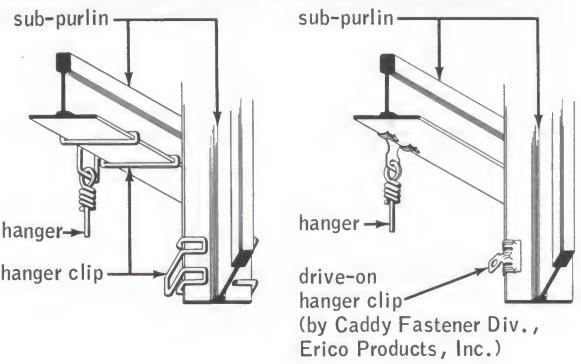


skylight detail



hanger details for suspended ceilings

hanger and hanger clips - not by USG Roof Deck Contractor
(a convenient lather's wire tie may be used for suspension)



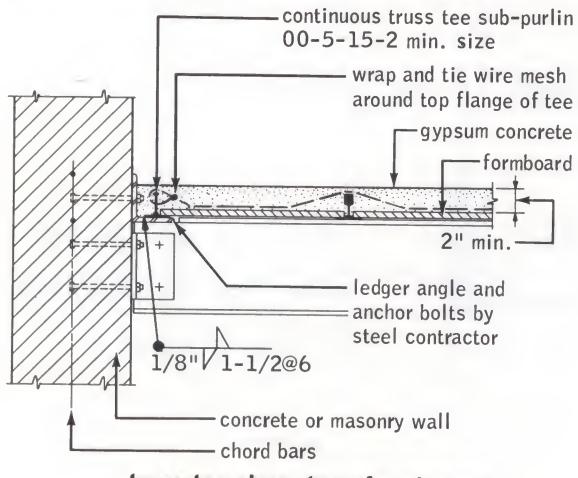
suspended ceilings

approved seismic diaphragm

scale: $\frac{3}{4}'' = 1'-0''$

U.S.G. poured gypsum roof decks with truss tees and reinforcing mesh offer an approved construction to resist seismic shock. The gypsum fill flows through the truss tee to form a rigid diaphragm with excellent resistance to shear and uplift. Design procedure is similar to that of reinforced concrete using gypsum stress values allowed by the applicable code (see table). See U.S.G. Bulletin IR-61 for complete design and supporting test information.

sub-purlins parallel to shear-resisting elements



truss tee shear transfer element

allowable shear-reinforced gypsum concrete

gypsum concrete thickness, in. (1)	reinforcing mesh type	allowable shear values, lbs. per lin. ft. (2)	
		PYROFILL (3) with truss tees	THERMOFILL (4) with truss tees
2	4"x8" #12-#14	840	710
2	KEYDECK	1060	910
2½	4"x8" #12-#14	890	760
2½	KEYDECK	1120	960

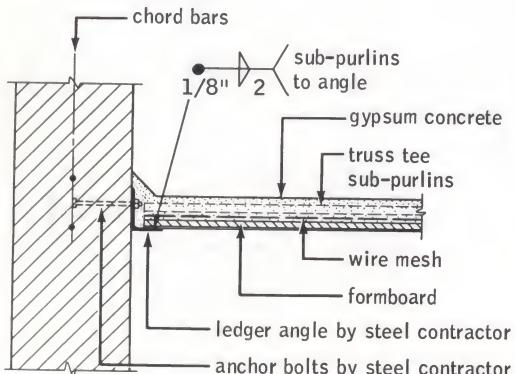
(1) Based on 500 psi compressive strength gypsum concrete Class A.

(2) California Administrator Code—Title 21 data varies slightly in shear calculations and field application. Consult U.S.G. representative for assistance.

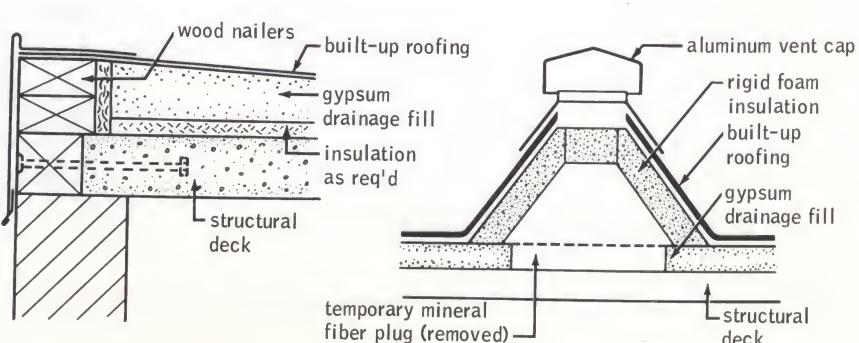
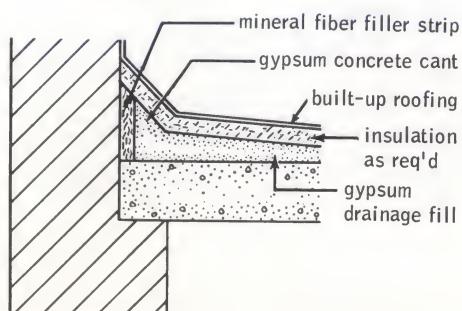
(3) See UBC Std. No. 24-13 and Research Recommendation 1312.2, ICBO.

(4) See Research Recommendation 1683.2, ICBO.

sub-purlins perpendicular to shear-resisting element



drainage slope fill details



drainage slope fill

SA

305

Gypsum Concrete Roof Systems

the low-cost fireproof assembly for simple, fast, all-weather installation

In this assembly, gypsum concrete is mechanically mixed, poured-in-place over flat decks and screeded to provide proper drainage. Applied in thicknesses from 2" to 8" when roofing is directly attached—from 0" to 8" when roof insulation is adhesively applied atop the fill. Suitable for use over poured concrete, wood, precast concrete or cement tile decks, gypsum concrete sets up quickly into a smooth monolithic slab ready for immediate roofing. The fill may also be installed over polystyrene or polyurethane rigid roof insulation where greater thermal resistance is required. Most features of U.S.G. roof deck systems are available when PYROFILL or THERMOFILL Gypsum Concrete is used as drainage slope fill.

limitations

1. Drainage slope fill systems are not structural roof decks.
2. Certain recommendations concerning roofing, ventilation, expansion and contraction must be adhered to for satisfactory performance of gypsum drainage slope fill (see Specifications, page 14 for details).

average thickness

When gypsum fill is sloped to an inside drain, (see Fig. 1), the average thickness (t_a) can be determined from the following formula, where (t_h) is the thickness at the high point and (t_l) is the thickness at the low point:

$$t_a = \frac{2}{3}(t_h - t_l) + t_l$$

fill thickness

The graph (Fig. 2) may be used to determine fill thickness at the high point for various slopes and horizontal distances.

Example: Determine the fill thickness at the high point if the distance to the drain is 20' and the desired slope is $\frac{1}{8}$ " per ft.

Solution: Enter graph (Fig. 2) at 20' on the vertical scale and move right horizontally to the $\frac{1}{8}$ " per ft. slope line. The fill thickness for the high point will be found directly below on the horizontal scale and is $2\frac{1}{2}$ ".

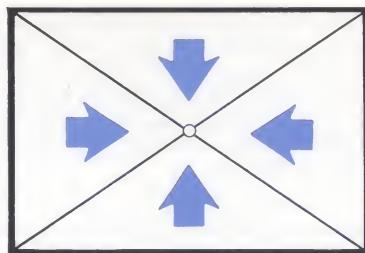


figure 1

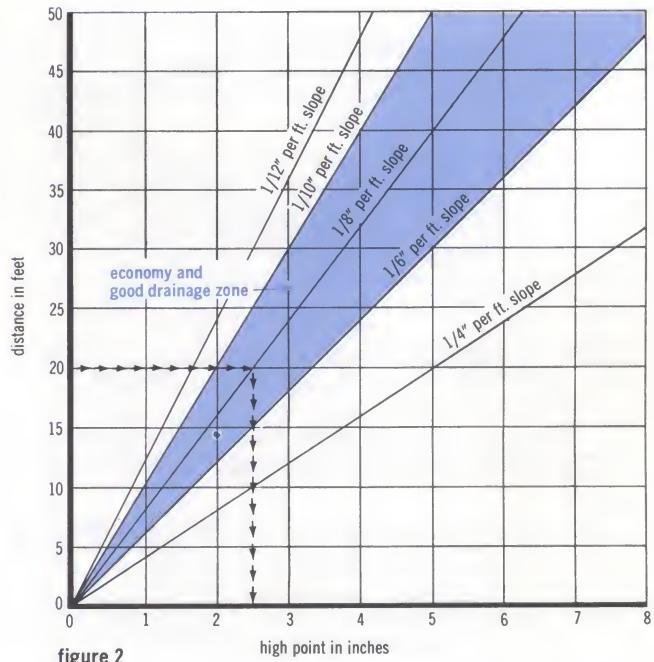


figure 2

thermal transmission—"U" values (1)

(for gypsum concrete drainage fill and rigid cellular polystyrene or glass fiber insulation over 6" concrete roof deck)

average thickness gypsum fill—in.	dry slab wt.—psf(2)		insulation thick.-in.		no ceiling—deck exposed				% AURATONE Panels or Tile			
			poly- styrene	glass fiber	PYROFILL		THERMOFILL		PYROFILL		THERMOFILL	
	PYROFILL	THERMOFILL			W	S	W	S	W	S	W	S
2	8.3	6.7	0	0	.34	.30	.30	.27	.18	.16	.17	.15
			1	1 1/16	.15	.14	.14	.13	.11	.10	.10	.10
			2	2 1/4	.09	.09	.09	.09	.07	.07	.07	.07
2 1/2	10.4	8.3	0	0	.31	.27	.27	.24	.17	.15	.15	.14
			1	1 1/16	.14	.13	.13	.12	.10	.10	.10	.09
			2	2 1/4	.09	.09	.09	.08	.07	.07	.07	.07
3	12.5	10.0	0	0	.28	.25	.24	.22	.16	.14	.14	.13
			1	1 1/16	.13	.13	.12	.12	.10	.09	.09	.09
			2	2 1/4	.07	.09	.08	.08	.07	.07	.07	.07
3 1/2	14.6	11.7	0	0	.25	.23	.22	.20	.15	.14	.14	.13
			1	1 1/16	.13	.12	.12	.11	.10	.09	.09	.09
			2	2 1/4	.09	.08	.08	.08	.07	.07	.07	.06
4	16.7	13.3	0	0	.23	.21	.20	.18	.14	.13	.13	.12
			1	1 1/16	.12	.12	.11	.11	.09	.09	.09	.08
			2	2 1/4	.08	.08	.08	.08	.07	.07	.07	.06

(1) Btu/sq. ft./hr./deg. F. temp. diff. (includes built-up roofing); W—for winter conditions, heat flow up; S—for summer conditions, heat flow down.

(2) Weight is for gypsum fill only.

USG roof deck systems with prestressed concrete roof framing

In these systems the gypsum roof deck slab is used in combination with prestressed concrete roof framing sections which may be spaced up to 16' o.c. With structural units such as the LIN-TEE member, the gypsum deck is poured over the entire area to form a monolithic slab. With alternate types of units the gypsum slab is located between the prestressed concrete framing members.

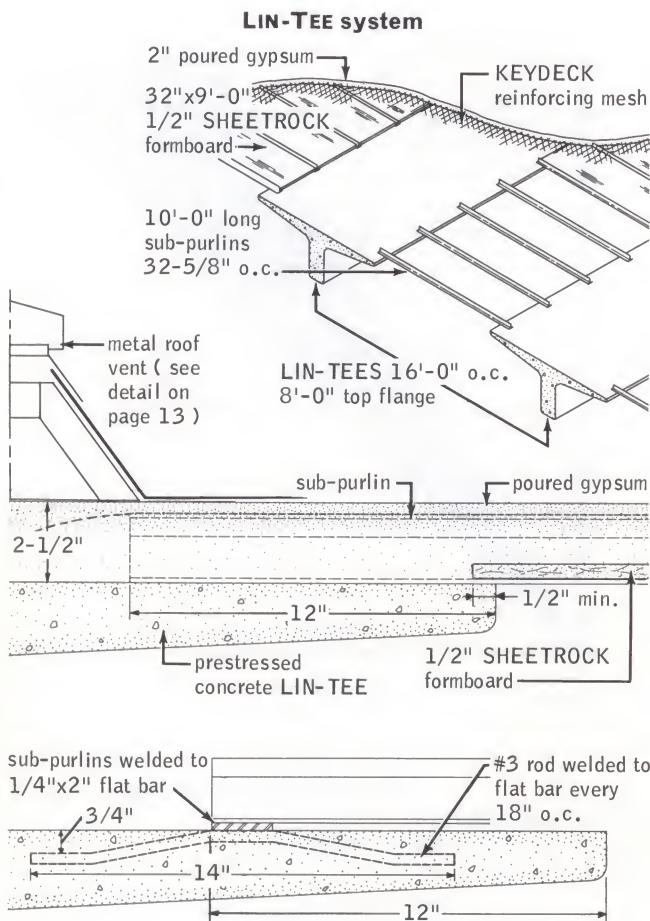
Steel sub-purlins are spaced 32 $\frac{5}{8}$ " o.c. and securely welded to steel bars or plates embedded in the prestressed concrete roof framing sections. Formboards are placed atop the bottom flanges of the sub-purlins. Reinforcing mesh is laid over the entire area in the LIN-TEE systems; only across the sub-purlins when precast concrete members are used. Metal roof vents

are installed atop fill over LIN-TEE members to release vapors.

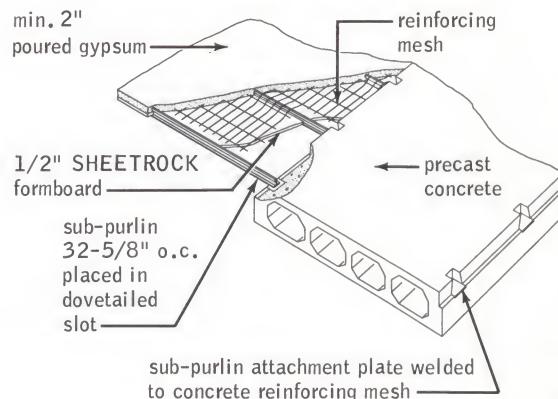
Gypsum roof decks used in combination with prestressed precast concrete structural elements provide a number of highly desirable features:

1. Clear spans up to 100' with shallow structural depths.
2. Noncombustible construction without added fireproofing.
3. Simplicity of construction for fast erection.
4. Economical initial cost and low maintenance.

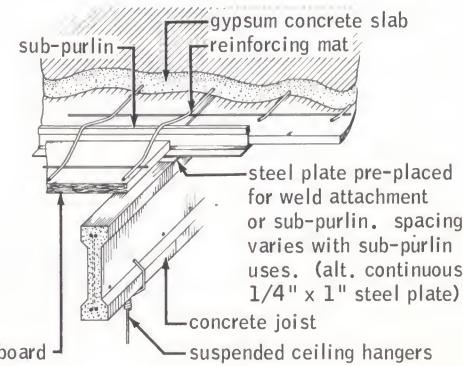
These features make this system ideal for use where long clear unsupported spans are required such as in warehouses, shopping centers and school gymnasiums. See U.S.G. Bulletin IR-51 for detailed specification.



precast concrete member system



roof attachment to concrete joists



specifications

notes to architect

1. Formboards should always be stored in a dry place. The normal moisture from a gypsum concrete slab has no effect on the performance of the formboards. However, soaking of the formboard prior to the pouring of the slab can result in excessive deflection. The roof covering should be applied as soon as possible after erection to protect the construction from precipitation. Discoloration or staining of the formboard may occur if subjected to prolonged exposure to moisture. If staining will be objectionable, the formboard may be painted; see recommendations below.

2. Drying—Gypsum concrete roof slabs dry out from the underside (through the formboard). Adequate heat and ventilation

below the slab are required to permit the escape of this moisture. In buildings without windows or with fixed windows, adequate mechanical (forced) ventilation is required to remove all construction moisture. Gypsum concrete used as a drainage fill over concrete slabs, steel decks and other decks of low permeability must have metal roof vents installed atop fill; see recommendations below.

3. Ventilation should be provided for any plenum or joist space between all roof deck and ceiling constructions. The venting of enclosed air spaces should be accomplished by natural or artificial means, both during and after construction of the building. Such venting accomplished by roof vents or soffit louvers to the

Gypsum Concrete Roof Systems

outside does not appreciably affect plenum or interior temperatures. Consult the Heating, Ventilating & Air Conditioning Guide, latest edition, published by the American Society of Heating, Refrigerating & Air Conditioning Engineers, for data on ventilating attic spaces and location of vapor barriers.

All gypsum concrete drainage slope fills applied over unvented roof decks and gypsum slabs over LIN-TEES must have metal roof vent installed atop fill to release expanding gases and vapors. Vents should be as manufactured by O. O. McKinley Co. or equal. One vent with 6" minimum stack diameter should be used for venting each: 1,000 sq. ft. of fill, 2" to 4" thick; 750 sq. ft. of fill, 4" to 6" thick; and 500 sq. ft. of fill, 6" to 8" thick. On small areas or over LIN-TEES, at least two vents should be used. Space beneath roof vent should be void of fill down to the structural deck or roof insulation. Vents may be removed after a period of 18 months if inspection reveals the fill has dried sufficiently and the roofing has performed satisfactorily.

4. Decorating—Gypsum roof decks provide a presentable undersurface that usually does not require further decorating. Where the formboard is to be left exposed and appearance of the formboard is critical, further decoration may be necessary.

When decoration is desired, painting should not be done until the slab is thoroughly dry. Before painting, the slab should be checked for dryness throughout its entire thickness. An electric type moisture meter can be used if contacts are driven well into interior of slab. Exposed metal, such as sub-purlin flanges, should be protected with METAL COAT Zinc Chromate Primer before finish coats are applied.

For SHEETROCK Formboards, a breather type paint such as TAL Latex Wall Paint is recommended, applied by brushing, rolling or spraying. A fungicide must be added to the TAL Latex Paint. For FIRECODE Mineral Fiber Formboard, use 1 or 2 coats of PRO-KYD Alkyd Flat Paint with fungicide added. GRAND PRIZE Latex House Paint is recommended on asbestos cement formboard, and does not require additional inhibitor. For fungicides in other paints, check manufacturer's specific recommendation. If surface damage defaces painted formboard, patch with TEXOLITE Paste Spackling Putty and paint (per instructions above) to restore original appearance. See U.S.G. Paint Products Folder SA-933 for paint specifications.

5. Expansion and Contraction—PYROFILL and THERMOFILL Gypsum Concrete roof decks, like all roof decks, are subject to expansion and contraction due to temperature changes. Bulb tees welded to steel framing limit slab movement that would exert itself at right angles to the direction of the bulb tees. The following is suggested as a guide:

- a. Provide expansion joints in the deck or drainage fill and the roofing wherever they are provided in the main structure.
- b. Long narrow buildings should have expansion joints through the deck and the supporting structure spaced not more than 200 ft. apart.
- c. Wings of "L", "U" and "T"-shaped buildings should be separated with expansion joints.
- d. A mineral fiber filler strip should be installed at all structural roof penetrations and at walls crossing the ends of sub-purlins. See details on pages 10 and 11; note seismic design recommendations.

To resolve specific problems, the coefficients of linear expansion should be considered. They are: for gypsum concrete, .0000085 in./in./F°; for steel, .0000065 in./in./F°. See Steel Construction Manual of the A.I.S.C., for method of calculating expansion of bodies by heat.

6. Uplift—All roof decks are subject to uplift forces and must be anchored to supports to resist this uplift. In developing adequate resistance, the total dead load of the roof deck can be considered as part of the total resistance. In laboratory tests, PYROFILL Gypsum Concrete roof decks, using steel rails or bulb tee sub-purlins welded to the steel framing, have an average uplift resistance equivalent to more than 125 lbs. per sq. ft. Reference: Armour Research Foundation Test M1068.

7. Roofing—Once PYROFILL and THERMOFILL have set, the complete built-up roof covering should be installed as soon as practical but not later than two days after pouring to protect the fill from excessive wetting from rain or snow and to develop optimum nail holding power. For built-up roofing application direct to fill, a min. 40-lb. coated base sheet, or equal, nailed dry is preferred for the first ply. Drive nails into wet slab as soon as possible; rusting increases holding power. See table, page 9, for nail-holding values.

The provision in this specification for a meeting between general, roof deck and roofing contractors to schedule the work should also be included in the roofing specification.

8. Heavy Loads—Although the reinforced PYROFILL gypsum deck slab will carry loads in excess of 100 lbs. per sq. ft. with an adequate safety factor, the sub-purlins or bar joists govern the safe load limit. All superimposed concentrated loads, such as flagpole bases, water tanks and ventilating fans, must be directly or indirectly supported on steel framing, not on the gypsum slab.

9. Steep Roofs—PYROFILL and THERMOFILL Gypsum Concrete roof slabs are designed to receive built-up roof coverings. On steep roofs, where slate, ceramic tile or rigid type shingle roof coverings are required, the use of USG Metal Edge Gypsum Plank is recommended (see U.S.G. Folder SA-306).

10. Suspended Ceilings—Suspended ceilings under gypsum roof decks should be hung from the structural steel frame. If they are hung from the roof deck, the hangers should be attached to the sub-purlins, never to the gypsum slab alone. When hung from the sub-purlins, the sub-purlins must be capable of supporting the total weight including the ceiling load with a resultant deflection not to exceed 1/360 of their span. Attachment hangers and channel grillage are not furnished by the U.S.G. Roof Deck Contractor. See U.S.G. System Folders in this series for descriptions and details of ceiling assemblies.

11. Computer Design Service—U.S.G. offers a computer service to aid in selection and design of PYROFILL and THERMOFILL Gypsum Concrete roof decks. When given live and dead load conditions, allowable deflection and basic construction dimensions, the computer will provide optimum bar joist size, direction and spacing and sub-purlin size at conventional spacing. Ask your U.S.G. representative for details.

12. U.S.G. Certified Roof Decks—United States Gypsum will, upon request, certify PYROFILL and THERMOFILL Gypsum Concrete and USG Formboards when used together in a roof deck. Specimens of the fill are taken during application and tested at the factory for dry density and compressive strength in accordance with ASTM C472. After completion of testing and the job, U.S.G. and the contractor issue a certificate stating the poured gypsum concrete and formboards were applied according to requirements and specifications.

13. U.S.G. Metal Edge Gypsum Plank—See U.S.G. System Folder SA-306 in this series for gypsum roof plank design data, application details and specifications.

Gypsum Concrete Roof Systems

Part 1: general

1.1 scope—Specify as required to suit project conditions.

1.2 qualifications

Installation of poured gypsum roof deck and drainage slope fill shall be by a U.S.G.-approved roof deck contractor.

1.3 submittals

a. The roof deck contractor shall prepare and submit shop drawings before the work begins. These shop drawings shall be in agreement with poured roof deck specifications and details as provided in current U.S.G. System Folder on Gypsum Concrete Roof Systems.

b. Where Certified Roof Deck is requested, contractor shall submit to United States Gypsum roof deck specimens taken from job; these specimens shall meet standards established for a U.S.G. Certified Roof Deck.

c. Prior to pouring gypsum deck, representatives of the general contractor, roof deck contractor and roofing contractor shall meet and agree to procedures and coordination of operations to insure that decking is roofed within 48 hours after pouring.

1.4 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles and stored off the ground and in a place providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.5 environmental conditions

a. Ventilation shall be provided for any plenum or joist space between roof deck and ceiling assemblies. The venting of enclosed air spaces shall be accomplished by natural or artificial means, both during and after construction of the building.

b. Surfaces to receive gypsum concrete drainage slope fill shall be dry and free of frost and ice.

Part 2: products

2.1 sub-purlins: (USG Sub-purlin 20) (USG Sub-purlin 18) (USG Sub-purlin 16) (bulb tees produced from prime billet steel or rail steel ASTM A499) (KEYDECK Truss Tees) cleaned and painted with one coat (zinc chromate) (lead chromate) (red oxide) primer.

2.2 cross tees: 1" x 1" x 0.027" thick sheet metal, hot rolled or formed and (painted) (galvanized).

2.3 permanent formboards (select as required):

- a. SHEETROCK Formboard, ½" thick, 32" wide, treated, in lengths equal to main purlin spacings (12' max.).
- b. FIRECODE Mineral Fiber Formboard (Custom) (Economy), (¾") (1") (1½") (2") thick by (24") (32") wide (select lengths from table, page 5).
- c. Asbestos Cement Formboard, ¼"x32"x48".

2.4 reinforcing mesh: 48-1214 galvanized steel, welded wire mesh or KEYDECK galvanized steel, woven wire mesh. Effective cross-sectional area of mesh at right angles to sub-purlins shall be not less than 0.026 sq. in. per ft. of mesh width.

2.5 gypsum concrete: (PYROFILL) (THERMOFILL) mill-formulated, composed of calcined gypsum and aggregates to comply with ANSI A59.1-1968 and ASTM C317-64 (1970) standards.

2.6 water: Potable and not contain impurities that affect the setting of gypsum.

2.7 mixes: Gypsum concrete shall be mixed with clean water only, using (8½ gallons per 80 lbs. PYROFILL Concrete) (8 gallons per 67 lbs. THERMOFILL Concrete).

Part 3: execution

3.1 condition of surfaces

Prior to drainage fill application, contractor shall examine thoroughly all surfaces to receive fill. The contractor shall report to the architect or owner's agent in writing any defects considered detrimental to proper application of fill so defects can be remedied before fill is applied.

3.2 sub-purlin installation

Place and weld each sub-purlin to main purlins at each contact point, using fillet welds ½" minimum length placed on alternate sides of sub-purlins where accessible. All end joints are to bear on roof supports (stagger the line of end joints).

3.3 formboard installation

Place formboards on sub-purlin flanges with all end or cross-joints supported, forms to fit neatly on all four edges. Cut forms to fit at walls, curves and openings as required. Install cross tees to support end joints of square-edge formboards not supported by roof framing. Lay no more formboard than can be covered by completed slab on same day.

3.4 reinforcement placement

Place reinforcing mesh with heaviest wires at right angles to sub-purlins. If KEYDECK is used, place 16-ga. wires at right angles to sub-purlins. Lap mesh ends at least 6"; do not lap sides of mesh. For fire-rated assemblies, lap mesh sides (4") (6"). Cut mesh to fit at wall, curbs and openings and carry mesh into all areas where gypsum concrete is poured.

3.5 gypsum concrete deck installation

Mix gypsum concrete and pour to minimum depth of 2" over formboards, ¼" over sub-purlins. Scree all surfaces to a smooth, even plane ready to receive waterproof roof covering specified in another section. After pouring, leave roof deck free and clean for other trades.

3.6 drainage slope fill installation

Mix gypsum concrete fill and pour over deck or roof insulation to the required thicknesses shown on the drawings. Scree all surfaces to a smooth, even plane ready to receive roof covering. Install mineral fiber filler strips at all structural roof penetrations and waxed fiberboard cylinders or mineral fiber plugs at roof vent locations as shown on the drawings. Pour cants and curbs as shown or required. After pouring, remove fiberboard cylinders and plugs; leave roof deck free and clean for other trades.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, PYROFILL, THERMOFILL, SHEETROCK, FIRECODE, AIRSON, ACOUSTONE, AURATONE, TEXOLITE, PRO-KYD, METAL COAT, GRAND PRIZE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

description and utility

THERMAFIBER Insulation Products consist of spun mineral fibers formed into mats of varying dimensions and densities depending on use, or into pellet forms for pouring or blowing into framing spaces. They are available in seven types of blankets, in loose fill, and as semi-rigid safing, curtain wall and column fireproofing insulation.

Compared to other types of insulation, **THERMAFIBER** has superior resistance to heat and sound transmission, resilience that assures full installed thickness, and outstanding durability. Its greater rigidity aids staying in place. In manufacturing it is quality-controlled from start to finish. Other features:

Noncombustible—the mineral fibers will not burn or support combustion. Use of **THERMAFIBER** blankets increases fire ratings of certain partition assemblies. As a semi-rigid felt, **THERMAFIBER** is an excellent fire barrier between floors of high-rise, curtain-wall buildings; provides column fire protection. When subjected to ASTM E119 time-temperature criteria, **THERMAFIBER** Insulation remains intact and is significantly superior to glass-fiber insulation in fire resistance.

Vapor Resistance—two types of **THERMAFIBER** blankets have built-in vapor barriers to protect against condensation—of aluminum foil or strong asphalted paper with excellent vapor permeability factors of 0.30 and less than 1.00 perm respectively. Highly effective in sidewalls when used with USG Gypsum Sheathing and Foil-Back SHEETROCK Gypsum Panels or Foil-Back ROCKLATH Plaster Base.

Nondeteriorating—the mineral fibers offer no sustenance to vermin; are resistant to decay and corrosion.

Moisture Resistance—mineral fibers do not absorb moisture. If wet, they dry quickly with adequate ventilation and recover their original insulating efficiency.

Rigidity, Strength—**THERMAFIBER** blankets have exceptional built-in rigidity, especially important for ceiling work. Batts have triple-thick, extra-wide flanges which make installation quicker and more secure.

Sound Control Value—**THERMAFIBER** blankets increase sound isolation and STC ratings when used in certain partition and floor/ceiling assemblies. Their acoustical absorption properties can be utilized to reduce noise levels and reverberation.

Ventilation—insulation of attics and crawl spaces should be accompanied by adequate ventilation—to help reduce air conditioning costs and control moisture condensation.

general limitations

1. Although the vapor barriers of **THERMAFIBER** blankets protect against the formation of condensation and reduce the danger of damage caused by condensation, over-humidification must be guarded against. If the relative humidity in the building is excessive, steps must be taken to reduce the sources of moisture.

2. Recommended minimum air space thicknesses are: in walls, $\frac{3}{4}$ "; in ceilings and floors, 1". With masonry walls, an air space of at least $\frac{3}{4}$ " should be provided between insulation and exterior wall. If **THERMAFIBER** Insulation is placed in direct contact with exterior walls, the masonry must be watertight. Positive vapor barriers such as Foil-Back SHEETROCK or ROCKLATH or 4-mil polyethylene film should be applied to



THERMAFIBER Safing Insulation fits between deck and spandrel panel.

room side of furring members in order to reduce possibility of condensation on cold masonry walls.

3. Blankets, other than Reverse Flange Blankets, placed between floor joists over unexcavated or basement areas, should be supported by wire mesh, woven tie-wire or flexible metal rods. In high-humidity areas, Reverse Flange Blankets also require support.

4. Additional support is required for $5\frac{1}{4}$ " and 6" thick blankets when joist spacing exceeds 16" o.c. and for blankets 3" or thicker installed between joists over suspended ceilings in high-humidity areas.

thermal insulating properties

In this era of fuel shortage, adequate insulation is an important part of the government's energy-conservation program. Proper insulation reduces heat transmission through walls, ceilings and floors to control interior temperatures for added comfort and fuel savings. Insulation is unique in amortizing its cost with dividends from lower heating/cooling costs.

High thermal performance—the no. 1 requirement of insulation—is assured with **THERMAFIBER** Insulation, which also provides significantly superior fire resistance compared to low-melt point glass fiber insulation.

In accordance with industry standards, **THERMAFIBER** Insulation products are labeled to show each product's thermal resistance (of insulation only) and thickness. Resistance and conductance values listed below are for insulating blankets shown on pages 2 and 3.

product & thickness	therm. resist. (R) (insul. only)	conductance (C)	product & thickness	therm. resist. (R) (insul. only)
kraft-faced blankets				
6"	22	0.045	6"	22
$5\frac{1}{4}$ "	19	0.054	$5\frac{1}{4}$ "	19
$3\frac{3}{8}$ "	13	0.074	3"	11
3"	11	0.090	$2\frac{5}{8}$ "	9

NOTE: All **THERMAFIBER** Blankets are manufactured to possess conductivity (k) of 0.27 and resistance (1/k) of 3.70, per in. thickness.

thermal resistance values* (R=1/C)
for use in calculating heat transmission coefficients (U)

$\frac{25}{32}$ " insulating sheathing (1).....	2.06	$\frac{1}{2}$ " gypsum panels.....	0.45
$\frac{1}{2}$ " insulating sheathing (1).....	1.32	$\frac{3}{8}$ " plaster base.....	0.32
$\frac{1}{2}$ " gypsum sheathing (1).....	0.45	$\frac{1}{2}$ " sanded plaster.....	0.09
$\frac{1}{2}$ " plywood.....	0.63	$\frac{1}{2}$ " plaster with lightweight aggregate.....	0.32
$\frac{3}{4}$ " plywood.....	0.94	portland cement with sand aggregate (per in.).....	0.20
$\frac{1}{4}$ " hardboard.....	0.18	4" common brick.....	0.80
$\frac{25}{32}$ " softwood (pine).....	0.98	4" face brick.....	0.44
$\frac{3}{4}$ " hardwood.....	0.68	8" clay tile.....	1.85
asbestos shingles.....	0.21	8" concrete block with sand aggregate.....	1.11
1"x8" wood drop siding.....	0.79	vapor-permeable felt.....	0.06
$\frac{3}{4}$ "x10" beveled wood siding.....	1.05	vapor barrier plastic film.....	negl.
exterior stucco (per in. thickness).....	0.20	carpet and fiber pad.....	2.08
$\frac{3}{8}$ " built-up roofing.....	0.33	floor tile—asphalt, vinyl.....	0.05
wood shingle roofing.....	0.94		
asphalt shingle roofing.....	0.44		

(1) Based on data by United States Gypsum

(type of insulation)
non-reflective reflective

air space values		
1" to 4" heat flow up.....	0.94	2.73
1" to 4" heat flow down.....	1.08	4.41
$\frac{3}{4}$ " to 4" heat flow horizontal.....	1.01	3.45
air surface values		
heat flow up.....	0.61	1.32
heat flow down.....	0.92	4.55
heat flow horizontal, outside air (15 mph velocity).....	0.17	—
heat flow horizontal, inside air (still).....	0.68	—

*Based on listings in ASHRAE Guide & Data Book.

sound control properties

THERMAFIBER Insulation has excellent sound-absorbing properties in addition to providing thermal values. Sound-absorbing materials absorb energy from sound waves and convert it to heat. As energy is absorbed, there is a proportional reduction in the amount of sound transmitted.

Two types of THERMAFIBER Insulation are used for their acoustic properties:

THERMAFIBER Regular Blankets, enclosed in heavy paper, are used in wood-frame construction; **THERMAFIBER Z-Furring Blankets** and **THERMAFIBER Sound Attenuation Blankets**, paperless and of greater density, are designated in fire-rated assemblies. THERMAFIBER Insulation in partition cavities improves STC ratings up to nine points.



Installing THERMAFIBER Blankets between metal studs.

Sound ratings are based on tested results of specific components and details of assembly, not on the ceiling or partition membrane alone (see Construction Selector for tested assemblies). The sound control of an assembly cannot be accurately predicted if insulation of a lesser density is substituted.

types and functions

insulating blankets

THERMAFIBER Regular Blankets are faced on one side with strong asphaltated vapor barrier that extends to form nailing flanges, and are encased on the other sides with porous, kraft breather paper. These blankets also are supplied open-faced without breather paper. Uses: ceilings, floors, walls. Available in $\frac{25}{32}$ " to 6" thicknesses and in widths to accommodate common structural spacings. Federal Specs: meet HH-I-521E Type II.

THERMAFIBER Reverse Flange Blankets are designed for application from the exterior or "cold" side of framing members. Fully enclosed in same manner as THERMAFIBER Regular Blankets, except that stapling flanges extend from breather side. Uses: for floors over unheated crawl spaces, recessed between joists; also in walls and ceilings accessible from outside. Available in 3" thickness, 15" width. Federal Specs: meet HH-I-521E Type II.



THERMAFIBER Aluminum Foil-Faced Blankets are similar to paper-enclosed Regular Blankets, but with highly reflective aluminum foil laminated to vapor barrier side. Blankets require a minimum air space next to the foil of $\frac{3}{4}$ " in sidewalls and 1" in ceilings to fully benefit from the foil reflectivity. Uses: ceilings, walls, floors with air space—most effective with air-conditioning and in areas of extreme summer temperatures. Available in $2\frac{3}{8}$ ", 3", $5\frac{1}{4}$ " and 6" thickness, 15" and 23" widths. Federal Specs: meet HH-I-521E Type III.

THERMAFIBER Fast-Fit Blankets have no flanges, thus eliminate need for staple fastening: are made slightly wider than normal to give snug friction fit between studs; open-faced on breather side. Uses: for sidewalls only. Fast-Fit Blankets require a separate vapor barrier, such as Foil-Back SHEETROCK Gypsum Panels, ROCKLATH or IMPERIAL Plaster Bases, or a 4-mil polyethylene film. Available in 3" and $3\frac{3}{8}$ " thickness, 15" width. Federal Specs: meet HH-I-521E Type II.

THERMAFIBER M-S Blankets are specially designed for insulating exterior furring and curtain wall assemblies which utilize metal studs. They are flangeless, open-faced on breather side and require same types of separate vapor barrier as Fast-Fit Blankets. Staple-attached to gypsum sheathing or held in place against metal lath with horizontal tie-wires. Available in 3" and $3\frac{3}{8}$ " thickness, 16" and 24" width, 48" and 96" length. Federal Specs: meet HH-I-521E Type II.

THERMAFIBER Z-Furring Blankets are designed for use as an effective semi-rigid insulating material in exterior wall furring applications using USG Z-Furring Channels. They require same types of separate vapor barrier as Fast-Fit Blankets. Blankets are a paperless, semi-rigid spun mineral fiber mat, 1" thick, 4.0pcf density, 0.23 "k" value, 24" width, 48" length. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Federal Specs: meet HH-I-521E Type I.

sound attenuation blankets

THERMAFIBER Sound Attenuation Blankets are a paperless, semi-rigid spun mineral fiber mat which substantially improves STC ratings when used in stud cavities of U.S.G. partition assemblies. Each blanket has a dense, highly complex labyrinthine structure composed of millions of sound-retarding air pockets. Available in 1", $1\frac{1}{2}$ " and 2" thickness with 4.0, 3.0 and 2.5 pcf density respectively, and 24" width, 48" length; $1\frac{1}{2}$ " and 2" thickness also available 16" wide. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Federal Specs: meet HH-I-521E Type I.

THERMAFIBER Sound Attenuation Blankets are used in various partition systems listed at right (for details see Construction Selector—in Sweet's Sec. 9.5).



Application of
Foil-Faced Blankets

Application of
Sound Attenuation Blankets

Drywall Partitions

	STC Rating
Metal Stud—Double Layer Gypsum Panels	52 to 55
Metal Stud—Single Layer Gypsum Panels	45 to 57
Movable	45 to 50

Veneer Plaster Partitions

Metal Stud—Double Layer Base	48 to 53
Metal Stud—Single Layer Base	45
TRUSSTEEL Stud—Resilient Plaster Base	48

Conventional Plaster Partitions

Gypsum Tile—Resilient Gypsum Lath	55
TRUSSTEEL Stud—Resilient Gypsum Lath	46 to 52

safing insulation

THERMAFIBER Safing Insulation is a precision-preformed, semi-rigid mineral fiber felt, designed for use as a fire stop in the safe-off area of curtain-wall high-rise construction. It is noncombustible, noncorrosive to steel or aluminum, vermin-proof, moisture-resistant, mildew-proof and sound-absorbent; installed between concrete floor and spandrel panel. Insertion on support brackets or impaling clips is recommended. Available in sizes to meet project requirements, 2" to 4" thick, 24" standard width, length varies by U.S.G. plant: from Corsicana, Tex. 45"; S. Plainfield, N.J., 60"; Tacoma, Wash. 45"; Wabash, Ind. 48" or 60". Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Federal Specs: meets HH-I-521E, Type I, Class A; HH-I-558B, Form A, Classes 1 and 2.

function

Fire Resistance—provides effective 3-hr. fire barrier between floor and exterior curtain wall (see Test Procedure, page 4).

Smokeless Composition—THERMAFIBER Safing Insulation is noncombustible and produces no smoke when exposed to fire.

High Temperature Protection—fibers in THERMAFIBER Safing Insulation will not melt until temperature exceeds 2,000°F.; offer 50% greater fire safety than glass fibers which melt and lose resistance to fire at about two-thirds the temperature required for THERMAFIBER Safing Insulation.

Density—4 pcf. nom.

Thermal Conductivity (k)—0.24.

(continued on page 4)



THERMAFIBER
M-S Blanket

THERMAFIBER
Sound Attenuation Blanket

safing insulation (continued from page 3)

Sound Attenuation—49 STC was achieved with 4" thick THERMAFIBER Safing Insulation installed between uncaulked, steel cover plates in combination with a 54 STC concrete panel. This rating was superior to that of 2-psf sheet lead.

fire test procedure

Since there are no established tests for safing materials, and in order to develop an effective fire stop, United States Gypsum designed a testing procedure for use at its Research Center. Results of these tests have been accepted by code bodies throughout the nation.

THERMAFIBER Safing Insulation was tested by this method and endured over 3 hours of exposure to intense fire without losing its fire-stopping ability. The test was conducted in a furnace similar to that specified in ASTM E119 except with a 6'9" x 7'0" opening. The furnace top was rolled back 7½" to simulate floor-slab construction, and a typical curtain-wall assembly was used to close the furnace face. Two pieces of 4-pcf density THERMAFIBER Safing Insulation, 4" thick, 8" wide and 41" long, were installed with the joint centered for maximum exposure (see photo, upper right). The curtain wall was moved into place, compressing the insulation to 7½". Furnace temperatures conformed to the ASTM E119 time-temperature curve. Immediately prior to termination of the test, cotton waste was placed on the unexposed surface of the insulation; it did not ignite. The test was terminated at 195 minutes, with the THERMAFIBER Safing Insulation still in place, providing a barrier to the passage of flame and hot gases (center photo). The exposed surface of the insulation had changed color, but was still intact (lower photo).

Backed by these credentials, the product has been quickly adopted for use in several of the world's tallest buildings.



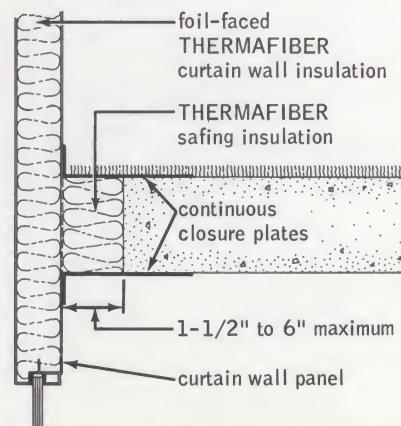
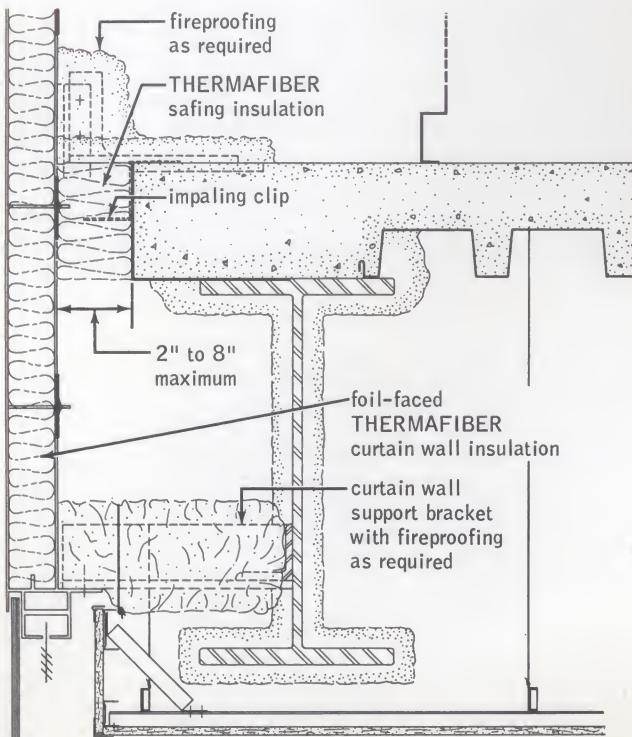
Placing THERMAFIBER Safing Insulation in test furnace.



THERMAFIBER Safing Insulation after test.



Insulation after test shows no change except discoloration.



in flat plate framing systems

curtain wall insulation

THERMAFIBER Curtain Wall Insulation is a fire-resistant, mineral-fiber insulation used in spandrel panels, exterior column covers and other metal-faced wall assemblies. Suitable for both prefabricated and field-assembled units, these blankets will not corrode steel, aluminum, copper or other metal wall facings. Their high thermal efficiency (see data below) helps eliminate condensation problems. They are vermin-proof, moisture-resistant and mildew-proof.

THERMAFIBER Curtain Wall Insulation is available in precision-preformed, semi-rigid blankets that range from 4.0pcf to 8.0pcf density. Two forms are produced (see table below for physical data and sizes):

Regular Blankets, used in double-faced metal wall panels, supplied without covering; meet fire ratings listed below. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0.

Foil-Faced Blankets, used in single-faced metal panels, supplied with an aluminum-foil facing applied on the vapor-barrier side. Foil-faced blankets (designated by letter "F" following type no.) have the added advantage of eliminating need for a separate vapor barrier. Moisture permeability of the foil is less than one perm. Fire hazard classification: flame spread 25, fuel contributed 0, smoke developed 0.

Federal Specs: meets HH-I-521E, Types I and III, Class A; HH-I-558B, Form A, Classes 1 and 2.

fire test procedure

Since there are no established tests for a spandrel panel and in order to develop effective fire protection for aluminum spandrel facings, U.S.G. designed a testing procedure for use at its Research Center. Tests were conducted using furnace time-temperature curves and recording procedures as specified in ASTM E119. The THERMAFIBER Curtain Wall Insulation effectively resisted the passage of flame to the exterior and kept the aluminum facing well below the melting point of the facing at the ratings listed below. Tests were conducted on blankets having a foil-facing which serves as a vapor barrier and is not required for fire rating.

Fire Containment Data

test duration†	product designation	thick-ness	test no.
1 hr.	CW 70	1½"	USG 6-3-71
2 hr.	CW 40(F)	2"	USG 10-18-71
2 hr.	CW 90(F)	2"	WJE-72481
3 hr.	CW 70(F)	3"	USG 11-30-71
5 hr.‡	CW 90	2"	USG 2-18-74

†Data based on ASTM E119 test conditions. ‡Test terminated to avoid furnace damage.

Thermal Performance Data

product	k-factor @ 75°F. Btu per hr. per sq. ft. °F./inch	"U" value of insulated spandrel*		
		1" thick	1½" thick	2" thick
CW 40	0.24	0.20	0.14	0.11
CW 70	0.23	0.19	0.13	0.10
CW 90	0.22	0.17	0.12	0.10

*Insulation attached direct to metal spandrel panel, "U" includes inside and outside air films.

Availability by U.S.G. Plants

product	S. Plainfield N.J.			Wabash Ind.†		
	min. thick.	max. thick.	width	min. thick.	max. thick.	width
CW 40	1"	4"	60"	1"	5"	48"
CW 70	1"	2"	60"	1"	3"	48"
CW 90	1"	2"	60"	1"	2"	48"

NOTE: Dimension tolerances—width $\pm \frac{1}{8}$ ", length $\pm \frac{1}{8}$ ", thickness compressed $\pm \frac{1}{8}$ ".

†Aluminum foil facing available in all sizes from Wabash plant only.



THERMAFIBER Curtain Wall Insulation after 5 hrs.-5 min. exposure in test furnace. Insulation remains intact (top) and still affords protection to aluminum panel (below). Test was terminated without failure, to protect furnace.

Physical Data

product	nominal density— lbs. per cu. ft.	approx. density tolerances—lbs./cu. ft.	minimum recommended thickness	container size	avg. wt. lbs./ MBF, in.:		application method
					sleeve or bag	ctn.	
CW 40 (F)	4.0	± 0.5	1"	per customer specification	345	385	hand friction fitted
CW 70 (F)	6.0	± 1.0	1"		595	635	
CW 90 (F)	8.0	± 1.0	1"		760	800	

NOTE: Consult U.S.G. Sales Engineer for limitations applying on shipments in bags.

mineral fireproofing

THERMAFIBER Mineral Fireproofing is designed to provide a fast, inexpensive method for protecting steel columns and spandrel beams. This noncombustible semi-rigid felt offers greater resistance to fire than glass fiber insulation and does not emit toxic gases when exposed to fire. It contains no asbestos, is moisture and mildew-resistant and noncorrosive to steel and aluminum. It is installed dry, in units; keeps environment and working area clean. Easily attached either with 12-ga. wire snap-on flange clips and 1½" diam. clinch shields or with ¼" diam. cap-type steel studs welded through fireproofing. **Limitation:** Exposed columns should have suitable surfacing.

Available in sizes to meet project requirements, 2" and 2½" thick, 24" standard width, 48" or 60" lengths from Wabash, Ind. plant; 60" length from S. Plainfield, N.J. (2" thick only). Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Federal Specs: meets HH-I-521E, Type I, Class A; HH-I-558B, Form A, Classes 1 and 2.

function

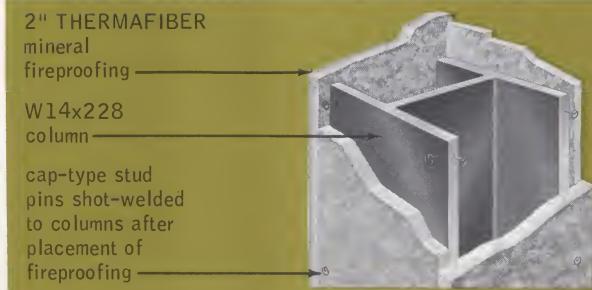
Lightweight—Density is 8pcf., nom.

Fire Resistance—Provides superior fire protection per pound of fireproofing compared to other board and spray-on types. Ratings up to 4 hrs. for columns and 3 hrs. for beams available (see table below).

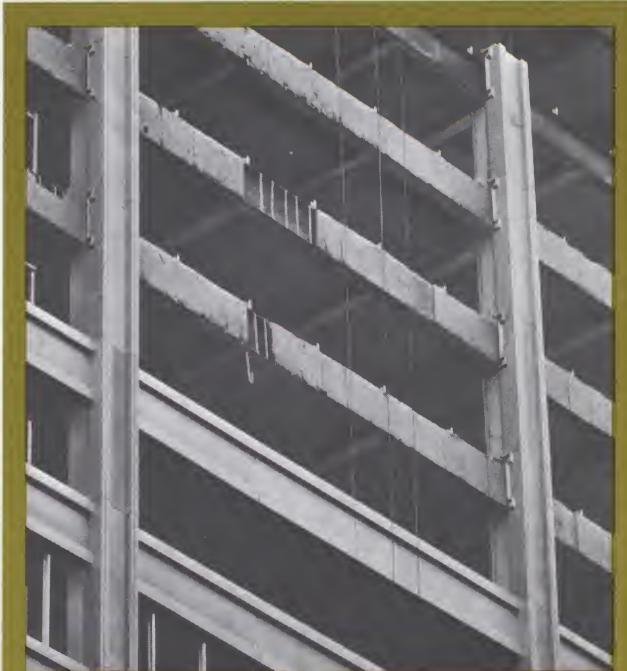
Nondeteriorating—the mineral fibers are resistant to decay and corrosion; offer no sustenance to vermin.

fire rating	description	UL Design No.	column or beam size
4 hrs.	Mineral Fireproofing 2" thick around column attached with ¼" steel wire studs welded to column 24" o.c. max.	X202	W14 X228
3 hrs.	Mineral Fireproofing double-layer 2" thick around column attached with 12-ga. flange clips and clinch shields spaced 16" o.c. max.	X306	W10 X49
3 hrs.†	Mineral Fireproofing double layer 2" thick around beam attached with 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2½" concrete on cellular steel floor units.	N304	W8 X24
2 hrs.	Mineral Fireproofing 2½" thick around column attached with 12-ga. flange clips and clinch shields spaced 24" o.c. max.	X305	W10 X49
2 hrs.‡	Mineral Fireproofing double-layer 2" thick around beam attached with 12-ga. flange clips and clinch shields spaced 16" o.c. max.—3¼" concrete on fluted steel floor units.†	D915	W8 X13
2 hrs.‡	Mineral Fireproofing 2" thick around beam attached with 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2½" concrete on fluted steel floor units.	N305 N304‡	W8 X24

†Restrained beam rating; unrestrained beam rating is 2 hrs. ‡Rating 1½ hrs. if cellular steel floor units are used.



4-Hr. UL Design X202



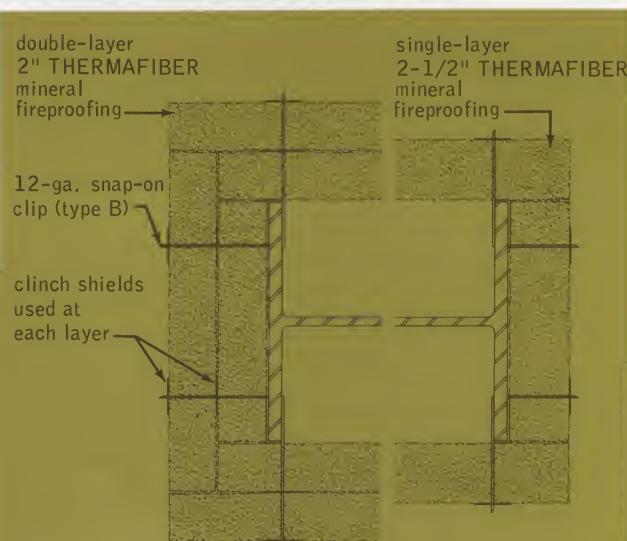
Fireproofing units shown in place over spandrel beams on bank building.



Lightweight, dry fireproofing surrounds beam supporting steel floor units.

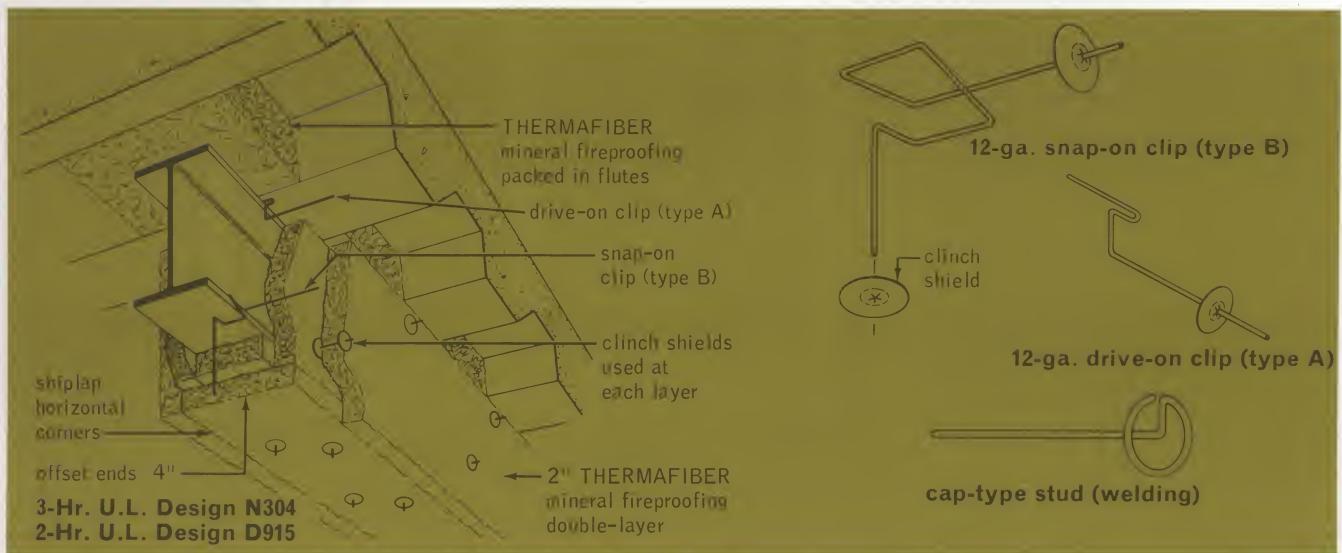


Flange clips and clinch shields secure fireproofing to column.



3-Hr. UL Design X306

2-Hr. UL Design X305

beam fireproofing details**granular insulation**

THERMAFIBER Blowing Wool consists of mineral fibers formed into pellets for installation by pneumatic machine. Fire hazard classification: flame spread 10, fuel contributed 0, smoke developed 0. Uses: in attics or floors directly over ceiling; in wall spaces of existing buildings. Federal Specs: meets HH-I-1030a Type I Class A. HUD now requires blowing wool installation to meet specific "R" values with thicknesses, coverages and weights as listed below:

(R) value (1)	30	22	19	11
min. thickness	10 $\frac{5}{8}$ "	7 $\frac{3}{4}$ "	6 $\frac{3}{4}$ "	3 $\frac{3}{8}$ "
max. coverage sq. ft./30-lb. bag	22	31	36	64
sq. ft./27-lb. bag	20	28	32	57
weight installed psf	1.45	1.05	0.95	0.55

(1) Mass resistance (of insulation only); based on "k" value of 0.35 and applied density of 1.65pcf. Resistance per in. (1/k) is 2.85. For installed resistance in ceilings, increase values shown by one unit.

THERMAFIBER Handy Fill is mineral fiber made in nodule form for spreading by hand. Has excellent uniformity and a special treatment to reduce dust. Uses: in attics or floors accessible from above, installed directly into joist cavity. Federal Specs: meets HH-I-1030a Type II. Applied thicknesses, coverage to provide "R" values shown:

(R) value (2)	22	19	13	11
min. thickness	7 $\frac{3}{8}$ "	6 $\frac{3}{8}$ "	4 $\frac{3}{8}$ "	3 $\frac{3}{4}$ "
max. coverage sq. ft./24-lb. bag	22	24	32	40

(2) Mass resistance (of insulation only); based on "k" value of 0.33 and applied density of 2.0pcf. For installed resistance in ceilings, increase values shown by one unit.

specifications**note to architect**

See U.S.G. Construction Selector for STC ratings of partition and floor/ceiling assemblies with THERMAFIBER Insulation; U.S.G. Product Folder SA-927 for USG Sound Deadening Board.

Part 1: general**1.1 scope—Specify to meet project requirements.****1.2 qualifications**

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products**2.1 materials**

2.1.1 Insulating Blankets: THERMAFIBER (Regular) (Open-Faced) (Reverse Flange) (Foil-Faced) (Fast-Fit) (M-S) (Z-Furring) blankets, () thick, () wide, () long.

2.1.2 Sound Attenuation Blankets: THERMAFIBER Sound Attenuation Blankets, () thick, () wide, 48" long, () pcf density.

2.1.3 Safing Insulation: THERMAFIBER Safing Insulation, 4" thick, () wide, () long, 4 pcf min. density, (having fire-rated foil facing) (with galvanized steel impaling clips) (with fire-resistant adhesive).

2.1.4 Curtain Wall Insulation: THERMAFIBER Curtain Wall, Type (), (Regular) (Foil-Faced) blankets, () thick, () wide, () long.

2.1.5 Structural Fireproofing: THERMAFIBER Mineral Fireproofing, () thick, () wide, () long.

2.1.6 Granular Insulation: THERMAFIBER (Blowing Wool) (Handy Fill), applied () thick to provide a Resistance of ().

Part 3: execution**3.1 insulating blanket application**

Install THERMAFIBER Insulation in framing spaces, including areas between floor joists and outside headers, leaving no voids. Install behind electrical outlets, around structural obstructions, jams, sills, etc. Cover all such areas as well as plates and headers with vapor barrier paper.

a. Insert flanged blankets between framing members, vapor barrier facing inward and recessed ($\frac{3}{4}$) (1") from face of framing, flanges stapled to sides of framing members at each end of blanket and along length of flanges. Staple flanges 8" o.c. max. on ceilings, 6" o.c. max. on walls and 4" o.c. max. on floors. Use $\frac{1}{16}$ " staples in a trigger or power stapler.

If required by local code, flanges on vapor barrier sides of blankets may be stapled to faces of framing members providing abutting flanges do not overlap and are stapled flat, without bulges or folds that will prevent tight attachment of interior surfacing materials.

b. Install Fast-Fit Blankets between studs from interior side of wall, recessed slightly from stud faces. Do not staple—friction-fit holds blankets in place. Provide separate vapor barrier with installation of: Foil-Back (SHEETROCK Gypsum Panels) (ROCKLATH Plaster Base) (IMPERIAL Plaster Base) (4 mil polyethylene film).

c. Install M-S Blankets between studs from interior side of wall. Attach blankets to gypsum sheathing using $\frac{1}{16}$ " staples with divergent points placed at each corner and in center of each blanket. Hold blankets tightly against metal lath backing with taut horizontal tie-wires spaced max. 36" o.c. Provide separate vapor barrier same as for Fast-Fit Blankets.

d. Apply granular insulation (with pneumatic blowing machine according to U.S.G. directions to achieve a density of 2 lbs./cu. ft.) (manually and spread to required thickness) to provide a Resistance of (). Apply to uniform thickness. Keep soffit vents open.

3.2 furring blanket application

Position Z-Furring Blanket vertically against wall surface. Hold in place with a USG Z-Furring Channel according to U.S.G. directions. Position next blanket so that it abuts attached furring member and hold in place with next furring channel.

3.3 sound blanket application

Install THERMAFIBER Sound Attenuation Blankets in stud cavities of sound-rated partitions, attaching to one base layer of (SHEETROCK Gypsum Panels) (ROCKLATH Plaster Base) (IMPERIAL Plaster Base).

Attach with five $\frac{1}{16}$ " long staples driven through each blanket, one in center and one spaced in approx. 3" from each corner. For reinforcement, drive staples to straddle drywall or similar nails placed against blankets, or through $1\frac{1}{2}$ " lengths of PERF-A-TAPE Reinforcing Tape or equivalent. Butt ends of blankets closely together and fill all voids. Allow air space between backs of blankets and back of opposite face layer.

3.4 safing insulation application

Impale safing insulation of proper size to safe-off area between curtain walls and floor slabs, leaving no voids.

3.5 curtain wall insulation application

(Press-fit) (Mechanically attach) curtain wall insulation to exterior wall. Install foil-faced insulation with foil facing inward. Butt ends and edges closely together and fill all voids.

3.6 column fireproofing application**3.6.1 UL Design X202-4 hrs.**

For all W14X228 columns, install THERMAFIBER Mineral Fireproofing 2" thick around column using $\frac{1}{8}$ " diam. steel wire studs welded to column after placement of fireproofing. Space studs 2" from top and bottom of assembly, 24" o.c. vertically and at least $\frac{3}{4}$ " from vertical edges.

3.6.2 UL Design X306-3 hrs.

Install 2" thick THERMAFIBER Mineral Fireproofing in double layer around column. Shiplap vertical corner joints and offset horizontal joints between layers. Impale insulation on 12-ga. wire snap-on clips friction-fitted over column flange and secure each layer with clinch shields. Space clips max. 16" o.c. and $3\frac{1}{2}$ " from ends of insulation.

3.6.3 UL Design X305-2 hrs.

Install THERMAFIBER Mineral Fireproofing $2\frac{1}{2}$ " thick around column. Impale insulation on 12-ga. wire snap-on clips friction-fitted over column flange and secure with clinch shields. Space clips max. 24" o.c. and $3\frac{3}{4}$ " from ends of insulation.

3.7 beam fireproofing application

Install 2" thick THERMAFIBER Mineral Fireproofing in double layer on sides and bottom of beam. Shiplap horizontal corner joints and offset joints between layers at least 4". Impale insulation on 12-ga. wire snap-on clips friction-fitted over beam flanges and secure each layer with clinch shields. Space clips max. (12") (16") o.c. and 2" from ends of insulation. Stuff additional insulation between crests of fluted deck and beam.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, THERMAFIBER, SHEETROCK, ROCKLATH, IMPERIAL, FIRECODE, DURABOND, PERF-A-TAPE, TRUSSTEEL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

U.S.G. MINERAL FIBER DIV. SALES OFFICES: **ALABAMA:** Birmingham, (205)252-6432 • **CALIFORNIA:** Torrance, (213)775-3116 • **INDIANA:** Wabash, (219)563-2111 • **NEW JERSEY:** S. Plainfield, (201)756-6776 • **TEXAS:** Corsicana, (713)666-0751 • **WASHINGTON:** Tacoma, (206)922-8756.

U.S.G. CONSTRUCTION PRODUCTS DIV. SALES OFFICES: **ALABAMA:** Birmingham, 870-7970 • **ARIZONA:** Phoenix, 274-5461 • **CALIFORNIA:** Fremont, 792-4400; Los Angeles, 388-1171 • **COLORADO:** Denver, 388-6301 • **DISTRICT OF COLUMBIA:** Washington, 223-8266 • **FLORIDA:** Jacksonville, 396-1628; No.

Miami Beach, 949-3436; Tampa, 253-5325 • **GEORGIA:** Atlanta, 393-0770 • **ILLINOIS:** Chicago, 321-4100 • **KANSAS:** Mission, 362-1315 • **KENTUCKY:** Louisville, 897-2529 • **LOUISIANA:** New Orleans, 241-2020 • **MASSACHUSETTS:** Waltham, 890-3835 • **MICHIGAN:** Southfield, 357-2000; Grand Rapids, 459-4477 • **MINNESOTA:** Minneapolis 929-4626 • **MISSOURI:** Maryland Heights, 872-9172 • **NEBRASKA:** Omaha, 333-5204 • **NEW JERSEY:** Cherry Hill, 779-7790; Montvale, 212-935-4487 • **NEW YORK:** Buffalo, 835-8200; Latham, 785-5872; New York 935-4443 • **NORTH CAROLINA:** Charlotte, 332-5023 • **OHIO:** Cincinnati, 771-3215; Chesterland, 729-1957; Columbus, 451-7710 • **OREGON:** Portland, 227-3731 • **PENNSYLVANIA:** Pittsburgh, 341-0364 • **TENNESSEE:** Nashville, 254-0622 • **TEXAS:** Dallas, 357-6271; Houston, 666-0751; San Antonio, 342-5249 • **UTAH:** Salt Lake City, 359-3751 • **VIRGINIA:** Norfolk, 543-3586; Richmond, 282-0998 • **WASHINGTON:** Bellevue, 455-2595 • **WISCONSIN:** Wauwatosa, 476-5920.

description and utility

Exterior protection of buildings has been a United States Gypsum specialty ever since the company began manufacturing roofing products in 1933. USG asphalt roofing offers the protection of rated fire resistance plus the two other characteristics most important to architects—beauty, expressed in harmonious, lasting colors, and durability, promising minimum maintenance for years to come.

Value and dependability are built into these products through the unique U.S.G. quality control standards. Asphalt shingles, for example, are made from top-grade felt that is asphalt-saturated to resist aging and coated with a special stabilized asphalt. Color-fast granules are embedded in the heavy-bodied coating to form a weather-protective shield. A second coating covers the back of the shingle—all carefully controlled to conform to rigid specifications. These manufacturing safeguards are backed by regular testing and constant product improvement at the U.S.G. Research Center, largest and best equipped in the industry.

The wide diversity of types, styles and colors makes it possible to satisfy almost every asphalt roofing requirement. U.S.G. offers differing product lines, tailored to market preferences, in three large geographic areas:

Northeast (states north and east of Virginia, W. Virginia and Ohio)—3-tab, self-sealing asphalt shingles in 300-lb., 265-lb. and 240-lb. weights; 4-tab, self-sealing, random-tab asphalt shingles in 265-lb. weight.

Upper Midwest (Iowa, Minnesota, the Dakotas, Nebraska, northern Illinois, northern Michigan, eastern Montana)—3-tab, Class C shingles in 300-lb. weight; 4-tab, self-sealing, random-tab asphalt shingles in 265-lb. weight; 3-tab, self-sealing type in 235-lb. weight; also double-coverage interlocking type and self-sealing type in 250 and 240-lb. weights.

West (California, Oregon, Washington, Idaho, Utah, Nevada, Arizona, Alaska, Hawaii)—20, 15 and 10-year bonded built-up roofing assemblies; 4-tab, Class A self-sealing asphalt shingles in 220-lb. weight; 3-tab, Class C self-sealing type shingles in 300-lb. and 235-lb. weights.

USG asphalt roofing is *made to work together*, economically and compatibly, with other USG exterior materials—poured



gypsum concrete roof decks, precast gypsum roof plank and wood fiberboard roof insulation (West only). The benefit of dealing with a single manufacturer is extended further by incorporating into the job such additional USG exterior products as gypsum or insulating sheathing, exterior stucco, mineral shingles, mason's lime and paint products.

types and functions

FIRECODE XX Class A Shingles—being marketed in Western region, massive four-tab shingles with highest UL fire rating. They also carry U.L. Wind-Resistant rating because of self-sealing feature—12 spots of high-strength adhesive placed across each shingle to bond firmly to previous course.

Available in 220-lb. weight; offer economies and superior performance versus many competitive shingles as a result of new manufacturing process. Asbestos and mineral stabilizers are blended into thick asphalt coating. Offered in color line of solids and blends specially designed for architectural applications. Meet Fed. Spec. SS-S-294a.

SEALCO Self-Sealing Strip Shingles—wherever the requirement is for maximum wind protection or for application to low-pitched roofs, SEALCO self-sealing shingles offer many advantages over ordinary shingles. SEALCO comes with 12 spots of high-strength adhesive placed across each shingle, automatically bonding the tabs to the nailed-down portion of the previous course. This self-sealing action takes place at normal roof temperatures, not limited to extremes of summer heat. SEALCO carries the U.L. Wind-Resistant label.

The placement of SEALCO sealant spots at intervals across the shingle helps the roof to breathe, and prevents trapping of condensation beneath the tabs. Unlike ordinary shingles, no hand sealing is needed on the lower pitches down to 2/12.

Rugged, fire-resistant SEALCO shingles are available in a wide range of beautiful solid and blended colors.

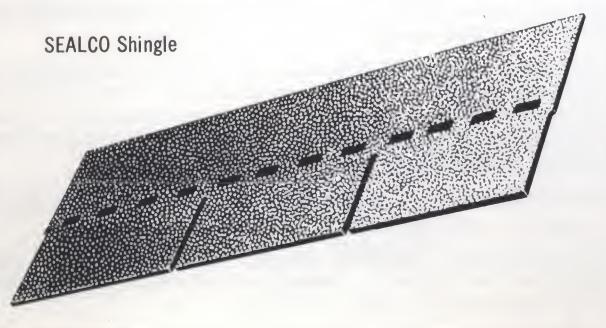
FORTIFIED Self-Sealing Strip Shingles—one of the finest custom shingles ever made—ideal for churches, institutions, public buildings as well as custom-built homes. Almost 30% heavier than standard strip shingles, designed to give maximum rugged wear with supreme roof quality.

This fire-resistant 300-lb. shingle is built from extra-heavy

FIRECODE Shingle

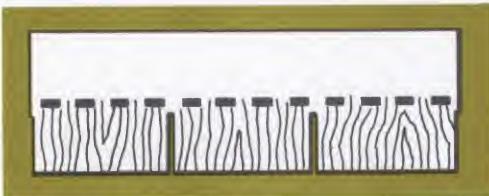


SEALCO Shingle

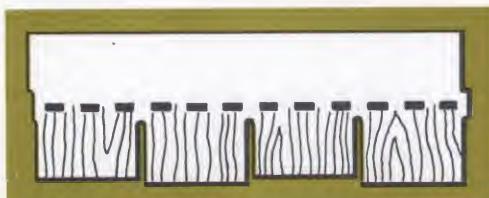


felt, given a super-thick asphalt coating and a deep layer of extra-coarse granules. The result is a rich, massive appearance with deep shadow lines created by the shingle's extra thickness. FORTIFIED offers long-run economy because of its built-in durability to resist wind and weather. Carries U.L. Wind-Resistant label. Available in popular solid and blended colors.

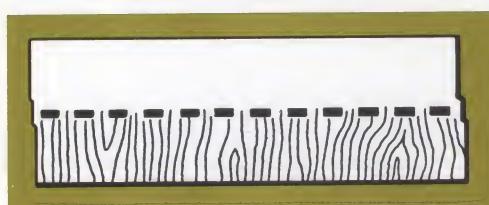
NOBILITY Self-Sealing Strip Shingles (available in Northeast)—a heavyweight shingle that offers excellent weatherability and long-lasting wind protection. Available in popular solid and pastel colors.



WEATHERWOOD Shake-Shingles—a heavy, 4-tab, self-sealing shingle that combines popular styling with lasting protection. Staggered butt design effects the random edge of hand-split shakes. Unique texturing simulates a woodgrain surface. Available in several blended earthtone colors for a rustic appearance.



DUBL-SEAL Strip Shingles (available in Upper Midwest)—a standard weight, self-sealing shingle without cutouts that provides a rustic textured surface and trim, straight-line, butt design. Full double-coverage and self-sealing features provide long-lasting weather protection. Quick alignment feature permits fast application and accurately aligned butts.



GRIP-LOCK Shingles (available in Upper Midwest)—a heavy interlocking shingle that combines 100% double coverage for extra weather protection and a unique double-locking device for added wind resistance with a handsome basketweave appearance. Available in white and textured colors to blend well with any type of architecture.

Specialty Shingles, available in areas of market demand, include individual Dutch Lap and Angle Lap shingles, and 3-tab Hexagon shingles for re-roofing and utility needs.



Asphalt shingle application

USG Asphalt Shingle Roofing—Specifications

product	availability			approx. weight per sq.	dimen-sion (in.)	shin-gles/sq.	expo-sure (in.)	head-lap (in.)	Under-writers label
	North-east	Upper Mid-west	West						
FIRECODE XX Class A			X	220 lbs.	12 x 36	80	5	2	A & W-R
FORTIFIED Self-sealing (3)	X	X	X (1)	300 lbs.	12 x 36	80	5	2	C & W-R
NOBILITY Self-sealing (3)	X			265 lbs.	12 x 36	80	5	2	C & W-R
SEALCO (3)		X	X	235 lbs. 240	12 x 36	80	5	2	C & W-R
SEALCO (3)	X			240 lbs.	12½ x 36	78	5½	2	C & W-R
WEATHERWOOD (3)	X	X		265 lbs.	12 nom. x 36	84	4¾ avg.	2¼	C & W-R
DUBL-SEAL (3)		X		240 lbs.	12 x 36	80	5	2	C & W-R
GRIP-LOCK (2)		X		250 lbs. 19½ x 20		115	—	—	C & W-R

(1) Coarse granules used. (2) Comply with ASTM D225 Type I. (3) Comply with ASTM D225 Type I and Fed. Spec. SS-S-300b Type III. W-R—wind resistant.

Good Application Practices—when failure of asphalt roofing occurs early in service, the cause is usually poor application or incorrect use of materials. These points should be checked:

(1) Rigidity of deck. If not rigid, movements may affect the lay of the roofing. Wood roof deck boards should be properly seasoned 1x6's or exterior grade plywood (min. $\frac{3}{8}$ " thick, preferably $\frac{1}{2}$ " thick).

(2) Ventilation. Condensation can cause warping and buckling of shingles. This is avoided by proper ventilation—minimum of 1 sq. ft. of free area for every 300 sq. ft. of attic area is recommended. Balanced system should be used, with 50% of louver capacity on or near the roof ridge and remaining 50% divided equally between overhangs.

(3) Choice of Shingles. Generally the heavier the shingle, the greater its durability. Self-sealing shingles—such as FIRECODE and SEALCO brands by U.S.G.—are recommended for roof pitches of 4/12 or more. For application on roof slopes down to 2/12, special instructions are available.

(4) Nailing. Nails of proper size, length and location should be used for each application (see Specifications).

(5) Accessories. Flashing, valleys, rakes, ridges, hips and eaves must be watertight, gutters and downspouts adequately sized for maximum drainage loads.

USG Built-Up Roofing (available in West only) comprises a full line of products for use on pitched, curved or level inclines over all common roof decks. U.S.G. also provides specifications and application standards for two classes of roof assemblies incorporating these products:

- Certified Roofs**, for which U.S.G. furnishes inspection service and issues a Certificate of Compliance.
- Bonded Roofs**, for which U.S.G. provides inspection service and issues a 10, 15 or 20-year surety bond paid for by the owner.

The table following lists the recommended USG built-up roof assemblies available in the Western region—a wide choice of gravel-surfaced, mineral-surfaced and asphalt-coated asbestos roof coverings. USG products used include various grades and types of asphalt felt, mineral wool felt, asbestos felt, mineral-surface and smooth-surface roll roofing, roofing asphalt, roof coatings and cements, and wood fiberboard USG Roof Insulation. For complete data and specifications, see the USG Built-Up Roofing Manual, RF-34.



Built-up roofing application

USG Built-Up Roofing Assemblies—Western Region Only

USG assembly number	years bondable	U.L. roof covering class (7)	roof slope limits	description of assembly	weight (3) in lbs./sq. ft.	
					nailable decks	non-nailable decks
gravel-surfaced roofs						
f-c-1	20	A	0" to 3"	2 layers FIRECODE Mark I base sheet; gravel surfacing	5.51	5.61
dl-a-1	20	A	0" to ½"	3 layers specification roofing; gravel surfacing	6.30	6.40
dl-b-1	20	A	0" to ½"	5 layers no. 15 asphalt felt (1); gravel surfacing	6.10	6.05
dg-a-1	20	A	0" to 1"	3 layers specification roofing; double gravel surfacing	7.90	8.00
dg-b-1	20	A	0" to 1"	5 layers no. 15 asphalt felt (1); double gravel surfacing	7.70	7.65
g-a-1	20	A	½" to 3"	3 layers specification roofing; gravel surfacing	6.30	6.40
g-a-2	20	A	½" to 3"	5 layers no. 15 asphalt felt (1); gravel surfacing	6.10	6.05
g-a-3	20	A	½" to 3"	1 layer specification roofing; 3 layers no. 15 asphalt felt; gravel surfacing	6.20	6.30
dl-c-1	15	A	0" to ½"	1 layer specification roofing; 2 layers no. 15 asphalt felt; gravel surfacing	5.80	5.90
dl-d-1	15	A (2)	0" to ½"	4 layers no. 15 asphalt felt (1); gravel surfacing	5.70	5.65
g-b-1	15	A	½" to 3"	1 layer specification roofing; 2 layers no. 15 asphalt felt; gravel surfacing	5.80	5.90
g-c-1	15	A (2)	½" to 3"	4 layers no. 15 asphalt felt (1); gravel surfacing	5.70	5.65
dg-d-1	10	A	0" to 1"	3 layers no. 15 asphalt felt; double gravel surfacing	7.15	7.25
g-d-1	10	A	½" to 3"	3 layers no. 15 asphalt felt; gravel surfacing	5.55	5.65
mineral-surfaced roofs						
f-c-5	20	A (4)	½" to 6"	2 layers FIRECODE Mark II base sheet; 1 layer FIRECODE Mark II cap sheet	2.20	2.30
m-a-1	20	A (5)	½" to 6"	3 layers no. 15 asbestos felt; mineral-surfaced FORTI-CAP sheet	2.00	2.10
f-c-4	15	B (5) (10)	½" to 6"	1 layer FIRECODE Mark II base sheet; 1 layer FIRECODE Mark I cap sheet	1.45	1.55
m-a-2	15	B (9)	½" to 6"	2 layers no. 15 asphalt felt; mineral-surfaced FORTI-CAP sheet	1.60	1.70
f-c-3	10	C (8)	½" to 6"	1 layer FIRECODE Mark.I base sheet; mineral-surfaced FIRECODE Mark I cap sheet	1.38	1.48
m-c-1	10	C	1" to 6"	3 layers no. 15 asphalt felt; 1 layer ADAMANT cap sheet	2.10	2.20
m-c-2	10	C (6)	2" to 6"	2 layers no. 15 asphalt felt; 1 layer ADAMANT cap sheet	1.70	1.80
smooth-surfaced asbestos felt roofs						
a-a-1	20	—	½" to 6"	1 layer no. 45 asbestos base sheet; 3 layers no. 15 asbestos felt (1); protective coating	1.85	1.55
a-b-1	15	—	½" to 6"	1 layer no. 45 asbestos base sheet; 2 layers no. 15 asbestos felt; protective coating	1.45	1.55
membrane waterproofing (for concrete decks under concrete floors, asphalt concrete paving and promenade tile)						
mw-e-1	—	—	—	3 layers specification sheet; 1 layer reinforcing fabric; 1 layer ADAMANT cap sheet		3.23
tile underlayment						
tu-e-1	—	—	3" to 6"	2 layers FIRECODE Mark II base sheet	1.05	1.15

(1) Omit one layer no. 15 felt over non-nailable decks. (2) Rating changes to Underwriters Class B when applied to a plywood deck. (3) Weights shown are nominal. (4) Rating applies to noncombustible decks of 1" max. slope. (5) Rating applies to 1½" max. slope. (6) Rating applies to 3" max. slope. (7) Ratings also applicable when applied over min. ½" USG Roof Insulation. (8) Rating also applies to 12" max. slope. (9) Rating applies to 2" max. slope. (10) Rating changes to Underwriters Class A when applied to noncombustible decks of 1½" max. slope.

Underwriters Label Service—asphalt roofing products bearing U.L. labels conform to standards as follows: "Class A", effective against severe fire exposures; "Class C", effective against light fire exposures—both classes not readily flammable, do not slip from position, and possess no flying brand hazard; "Wind Resistant", manufactured with factory-applied adhesive or integral locking tabs.

specifications

notes to architect

- a. *Fasteners for non-wood deck materials—when gypsum products, concrete plank and tile, fiber board, or similar materials other than wood are used for the roof deck, special fasteners and/or details for fastening are required to provide adequate anchorage for the roofing. In such cases it is recommended that the specifications of the manufacturer of the deck materials be followed in order to insure his responsibility for its performance.*
- b. *A 20-year warranty applies to 220-lb. FIRECODE XX Class A Shingles.*
- c. *For optimum performance of built-up roofing, sufficient slope should be provided to prevent ponding of water.*

Part 1: general

1.1 scope—Specify to suit project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles, handled and stored in a manner providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 warranties

Contractor shall furnish owner with 5-year Wind Warranty and (15-year) (20-year) (25-year) Weather Warranty for asphalt shingles. Warranties shall be registered with roofing manufacturer.

Part 2: products

2.1 materials

- a. **Asphalt Shingle Roofing**—(weight) (FIRECODE XX) (FORTIFIED) (SEALCO) (other) asphalt shingles (color) (specify from page 2).
- b. **Asphalt Built-up Roofing**—(select appropriate specifications from USG Built-Up Roofing Manual, RF-34).
- c. **Nails**—galvanized roofing nails (10 to 12 ga.) with $\frac{3}{8}$ " diam. heads (specify length from table following).

Recommended Nail Length—Wood Decks

purpose	nail length
Roll roofing on new deck.	1"
Strip or individual shingles—new deck.	$\frac{1}{4}$ "
Reroofing over old asphalt roofing.	$\frac{1}{2}$ "
Reroofing over old wood shingles.	$\frac{1}{4}$ "

Part 3: execution

3.1 condition of surfaces

Roofing contractor shall examine all areas to be roofed and report in writing to the architect or owner's agent any defects that he considers detrimental to proper application of roofing so remedial measures can be taken before roofing.

3.2 asphalt shingles

(1) **Underlayment**—For slopes of 4/12 and steeper, apply one ply #15 asphalt felt over roof boards with 2" headlap and 6" end laps; scatter nail at 12" staggered intervals.

For slopes of 2/12 to 4/12, apply two plies #15 asphalt felt over roof boards with 19" overlap and 6" end laps; fasten by blind nailing. From eaves to a point 24" beyond inside wall line, cover surface between plies with plastic roof cement.

At valleys, apply 36" wide underlayment strip centered over valley intersection. Lap ends of roofing underlayment at least 6" over valley strip and nail to hold in place.

(2) **Valleys**—Apply 18" wide strip of ADAMANT roll roofing face down, centered over intersection. Nail in place. Lap ends 12" and bed in plastic cement. Apply 36" wide continuous strip of mineral surfaced roofing face up and centered over valley; nail in place.

(3) **Shingle Application**—Begin application with starter strip or inverted shingle. For self-sealing shingles, apply starter course of shingles with tabs cut off. Extend starter strip and first course of shingles at least $\frac{3}{8}$ " over edge of deck. Lay shingles in true, straight courses with 2" overlap, 5" exposure and cutouts at middle of tab on preceding course. Securely attach each three-tab shingle with 4 nails spaced 1" from each end, 5 $\frac{1}{2}$ " above exposed butt and $\frac{3}{8}$ " above each cutout. Securely attach other types of shingles per manufacturer's directions. At valleys, cut off upper corner and cement shingles to valley lining or extend each strip at least 12" beyond center of valley and nail end of strip.

(4) **Hips and Ridges**—Cover hips and ridges with shingles cut in (thirds) (halves) or with individual 9"x12" shingles. Expose 5" to weather; nail 5 $\frac{1}{2}$ " from exposed end and 1" from each side.

(5) **Metal Edge Strips and Flashing**—Provide metal drip edge over underlayment at all eaves and gable ends. Fasten with nails 10" o.c.

Provide metal flashing at all vertical intersections and penetrations of roof surface before shingles are applied. Install base and cap flashing over shingles. Seal all flashing with plastic roof cement.

3.3 asphalt built-up roofing

(select appropriate specifications from USG Built-Up Roofing Manual, RF-34).

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company; USG, FIRECODE, FORTIFIED, SEALCO, GRIP-LOCK, DUBL-SEAL, FORTI-CAP, ADAMANT, WEATHERWOOD.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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SA

805

USG curtain wall systems

for design flexibility, tested performance
and architectural beauty

system folder



On cover:
UNIV. OF S. CAROLINA, AIKEN REGIONAL CAMPUS, Aiken, S.C.
Architect: LBC & W OF SOUTH CAROLINA



210 NORTH IRONWOOD DRIVE BUILDING, South Bend, Ind.
Architect: MATHEWS, PURUCKER & ASSOC., AIA



UNIV. OF WASHINGTON INTRAMURAL BUILDING, Seattle, Wash.
Architect: ROBERT BILLSBOROUGH PRICE & ASSOC., AIA



USG curtain wall systems

...lightweight framing systems
for exterior walls (non-load bearing)

description

USG Exterior Curtain Wall systems offer a wide range of effects for non-load bearing exterior walls. Utilizing conventional materials, methods and equipment, plus trades already on the job, these improved systems have been specified in all parts of the nation. Suitable for either steel frame or concrete structures, they are adaptable to provide esthetic versatility of custom construction at favorable initial costs.

framing systems

There are three basic framing methods to choose from: **USG Steel Studs**, channel type, roll-formed from 20-ga. galvanized steel; **USG Light Steel Studs**, modified channel type, roll-formed from various gauges of galvanized steel, and **TRUSSTEEL Studs**, open-web truss type, fabricated from high-tensile wire. USG Steel Studs, more typically used with interior drywall and veneer plaster systems, are an ideal back-up for brick veneer assemblies, reducing dead load 25% in comparison to concrete block backings. USG Light Steel Studs in three depths and a total of twelve different sections extend the advantages of USG Curtain Wall Studs to much greater limiting heights. TRUSSTEEL Stud systems, through the use of metal lath and plaster, permit curved walls and unusual partitioning. The wide choice of stud sizes and spacings accommodates various wall heights, wind loads and building modules.

Both types of studs are anchored at top and bottom in runners designed for each type of stud. THERMAFIBER Metal Stud Insulating Blankets are inserted in the cavity between studs.

exterior surfaces

Exterior surfaces may be brick veneer, portland cement-lime stucco or various decorative panels or siding materials.

Face or common brick, 4" thick, is laid with portland cement-lime mortar and secured with wall ties, spaced 24" o.c. vertically, and screw-attached to truss studs or through the sheathing to steel studs. This system offers speedier building enclosure, superior weather protection of a double-cavity wall and greater variety of insulation options. Portland cement-lime stucco is applied in three coats to a 1" thickness over 3.4-lb. galvanized metal lath. Self-furring metal lath is screw-attached through ½" USG Gypsum Sheathing to 20-ga. steel studs, or USG Poly-Backed Metal Lath is clipped and wire-tied to TRUSSTEEL Studs. The transparent plastic backing permits easy visual location of studs and fast clip placement and wire-tying.



INTERNATIONAL MINERAL & CHEMICAL BUILDING, Houston, Tex.
Architect: NEUHAUS & TAYLOR, AIA



TRUSSTEEL Studs with masonry veneer exterior/SHEETROCK Panels interior comprise but one variation of USG Curtain Wall Systems.



INTERNATIONAL MINERAL & CHEMICAL BUILDING, Houston, Tex.
Architect: NEUHAUS & TAYLOR, AIA

interior surfaces

Interior surfaces may be gypsum drywall, high-strength veneer plaster or conventional plaster. Hundreds of variations in finishes ranging from smooth trowel to oriental-style textures, painted or fabric-covered, are available for interior design.

With *gypsum drywall*, Foil-Back SHEETROCK SW Gypsum Panels, $\frac{1}{2}$ " or $\frac{5}{8}$ " thick, are screw-attached to the metal studs.

Veneer plaster interiors have Foil-Back IMPERIAL Plaster Base screw-attached to metal studs or to RC-1 SHEETROCK Resilient Channels screwed to TRUSSTEEL Studs. IMPERIAL Plaster is applied $1/16$ " to $3/32$ " thick over this large-size base.

For *conventional plaster* interiors, Foil-Back ROCKLATH Plaster Base is clip or screw-attached to studs and RED TOP Gypsum Plaster is applied $\frac{1}{2}$ " thick over the base.

function and utility

USG Curtain Wall Systems are adaptable to many types of structures such as schools, shopping centers, motels and apartments.

Design Freedom—Exterior stucco surfaces for this framing offer unlimited opportunity for creative design through the textural expression of smooth monolithic surfaces or random sculptural relief. Color and texture can be varied by the addition of coarse, colored aggregates which contrast boldly with brick, glass and concrete. The great range of possibilities allows the architect a wide latitude of expression for his design skills.

Versatility—By varying size and spacings of studs, walls of various heights can be constructed to accommodate wind load requirements up to 40 psf. Interior and exterior facings in various combinations offer the architect and owner a greater selection of surfaces finishes to meet specific functional and esthetic needs. The open-web design of TRUSSTEEL Studs allows greater flexibility in placing pipe or conduit within the framing.

Fire Resistance—Up to 4-hour rating available (see table).

Sound Control—The dampening effect of air space and insulation within the framing reduces the airborne street noise transmitted to the interior.

Thermal Insulation—High thermal performance meets the "All-Weather Comfort Standard" for electrically heated and air conditioned buildings (see page 11) for specific heat transfer characteristics.

Light Weight—These systems reduce dead load by 25% in brick masonry walls and up to 66% in textured panel assemblies, thus reducing structural requirements in foundations and footings.

Weather Resistance—Confirmed by tests, the systems meet air and water infiltration standards set by HUD and NAAMM for 40 psf wind pressure which is equivalent to a wind velocity of 125 mph.

Adaptability—USG Curtain Walls can be used in most types of steel or reinforced concrete constructions in which the load is borne by the structural framing and not imparted to the curtain wall.

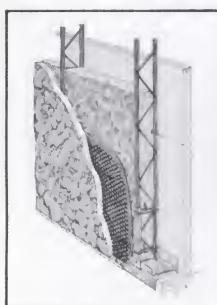
Economy—No new or unusual materials or techniques are required. All components and application procedures are familiar to mechanics.

limitations

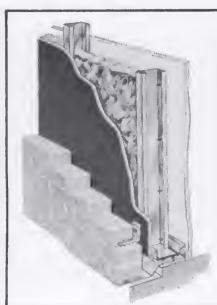
1. Non-load bearing constructions.
2. Limiting heights, maximum stud and runner attachment spacing for up to 40 psf wind loading are shown in Technical Data tables, pages 12 through 14.
3. Certain recommendations covering shadowing and spotting, expansion and contraction, air and water infiltration must be followed for satisfactory performance of USG Curtain Wall Systems (see Specifications, page 14).

fire ratings

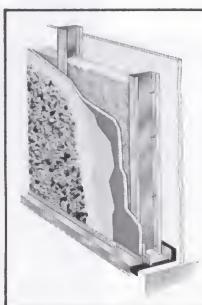
description	test no.	fire rating
3 $\frac{1}{4}$ " TRUSSTEEL studs 16" o.c.—3.4# poly-backed metal lath—1" cement-lime stucco exterior—3" THERMAFIBER metal stud blankets between studs—horizontal RC-1 channels 16" o.c. screw attached to studs— $\frac{5}{8}$ " Foil-Back SHEETROCK FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" plaster base and $\frac{1}{16}$ " IMPERIAL plaster interior	T-4866-OSU	1 $\frac{1}{2}$ hrs.
Same as above except $\frac{1}{2}$ " IMPERIAL FIRECODE "C" plaster base and $\frac{1}{16}$ " plaster interior	T-4866-OSU	1 hr.
3 $\frac{1}{2}$ " 20-ga. steel studs 16" o.c.— $\frac{1}{2}$ " gypsum sheathing—self-furring metal lath—1" cement-lime stucco exterior—3" THERMAFIBER metal stud blankets between studs— $\frac{5}{8}$ " Foil-Back SHEETROCK FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" plaster base and $\frac{1}{16}$ " IMPERIAL plaster interior	T-4851-OSU	2 hrs.
4" TRUSSTEEL studs 16" o.c.—exterior side 3.4# poly-backed metal lath directly attached and $\frac{3}{4}$ " cement-lime plaster—3 $\frac{1}{4}$ " STRUCTO-LITE (Type S) plaster in stud cavity—interior side 3.4# metal lath and $\frac{3}{4}$ " 100-2-100:3 gypsum sand plaster	UL Des U402 (was 13-4 hr.)	4 hrs.



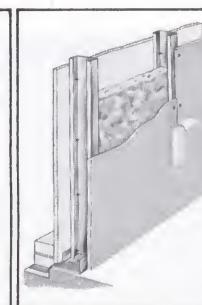
stucco exterior



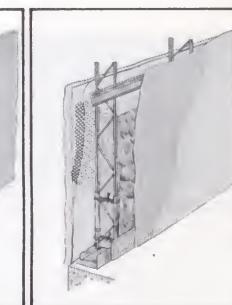
masonry exterior



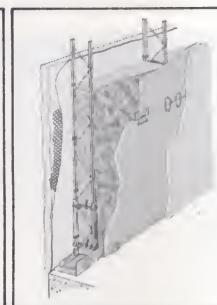
aggregated panel exterior



gypsum drywall interior



veneer plaster interior



standard plaster interior

design concepts and details

high-performance USG curtain walls adapt easily to creative design

USG Curtain Walls offer an unlimited opportunity to create individual form and texture. Analysis of the assemblies for surface materials, type of support, window styles and panel shapes common in architecture, reveals only a few variations in basic design.

The systems shown here are basic design concepts. After evaluation of structural and economic requirements, the final project drawings may incorporate more than one of these ideas. Following these system concepts are sectional details relating to each type of stud framing for steel or concrete structures. Included are variations to illustrate construction with exposed aggregates applied over stucco or asbestos board. Ceramic, porcelain enamel or other lightweight prefabricated panels are applied over gypsum sheathing and screw-attached to metal studs.

two and three-story system

This system is ideal for two and three-story buildings, particularly where vertical windows or window wall panels are desired. Wall-height studs are installed outside the structural elements, secured to supports at each floor and, if necessary, spliced at the support. Stud size, spacing and anchorage are determined by floor-to-floor heights or distance between supports. Parapet height should be less than one-fourth of the limiting stud height.

spandrel wall system

This system is selected when columns are exposed to provide vertical accent and where horizontally placed windows are combined with spandrel panels. The curtain wall is installed between structural steel girts which support the windows and the wall panels. Tubular girt sections, instead of angles or channels, will simplify installation of windows and wall panels.

infill panel system

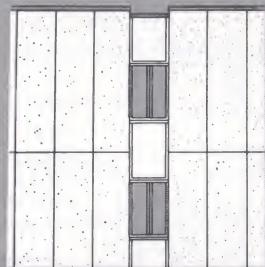
In this design concept, suitable for either stucco or masonry exteriors, the wall system is supported on the floor slab. Windows, or floor-to-ceiling height window panels, or doors are easily incorporated. When the slab extends beyond the wall, the projection may be used as a balcony or walkway area or for sunshading. When panels project beyond the face of the structure (see page 8), special attention to cap flashing and sealant is required to prevent leaks.

ledger supported system

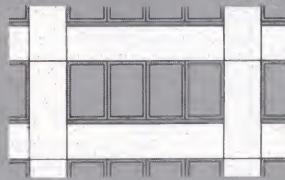
Stucco Exterior—In this system, walls are supported by ledger angles placed outside and secured to the structural framework of the building. Suitable for multi-story construction, this concept provides a broad expanse of smooth stucco surface. Vertical fins to accentuate appearance are easily constructed from studs and channels to suit job requirements. Windows may be used as individual units or as part of a window wall assembly with spandrel panels included.

Masonry Exterior—In this concept, only the exterior masonry veneer is supported by the ledger angles; the metal studs and interior finish are supported by the structural slab. Windows, either individual or in horizontal rows or vertical panels, are readily inserted in the veneer exterior.

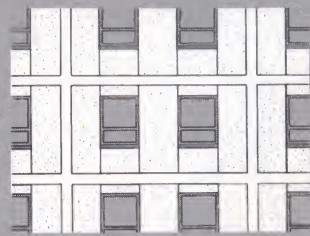
two and three-story system



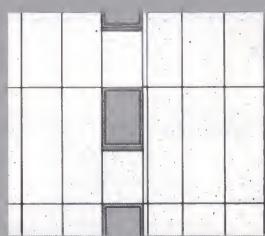
spandrel wall system



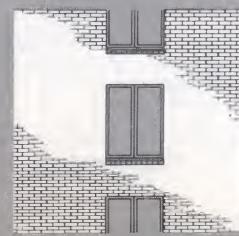
infill panel system



ledger supported system



stucco exterior



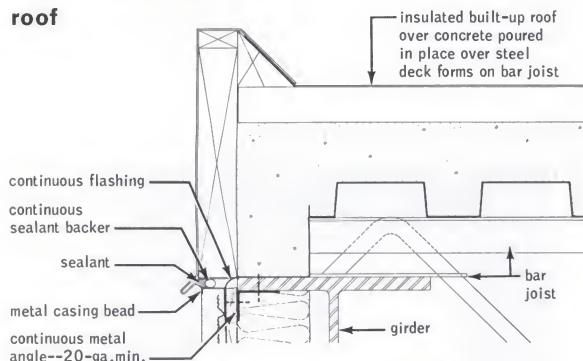
masonry exterior

details/steel stud assembly

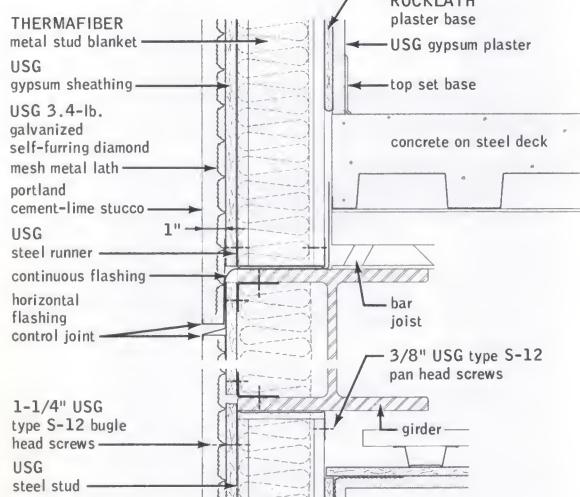
scale: $1\frac{1}{2}'' = 1'-0''$

exterior stucco/steel frame

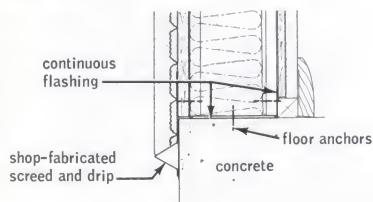
roof



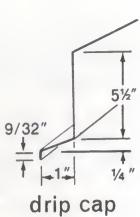
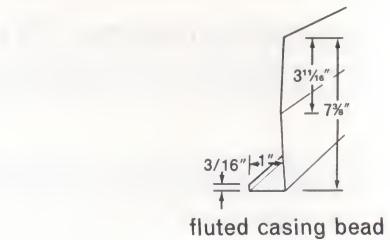
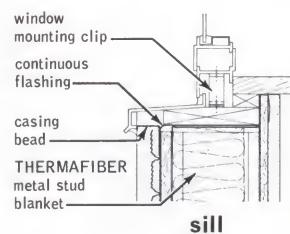
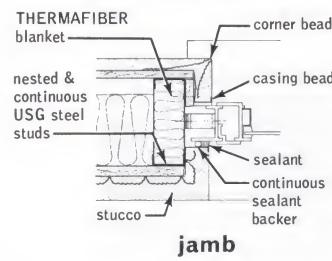
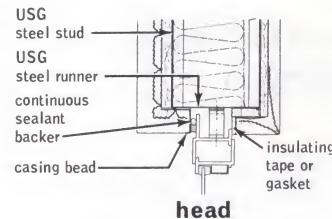
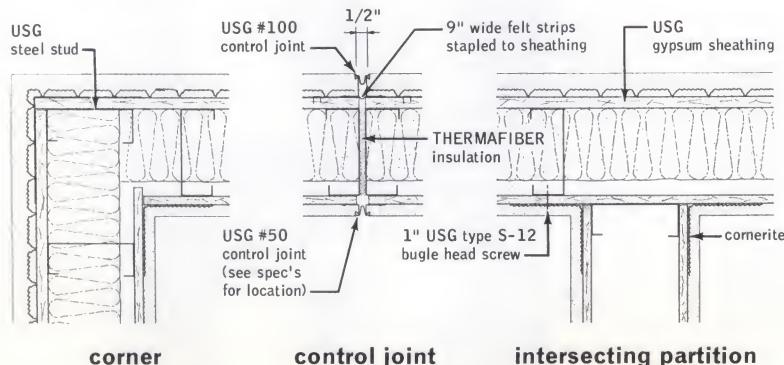
intermediate floor



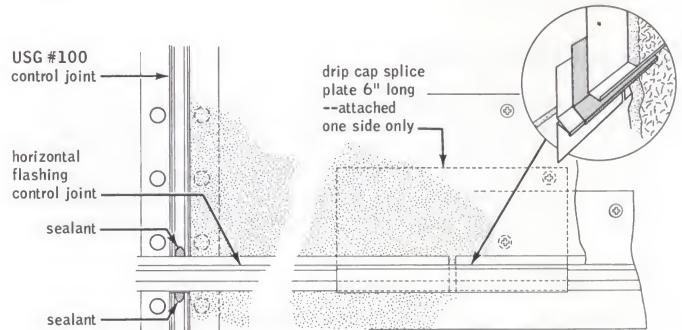
foundation



wall plan sections

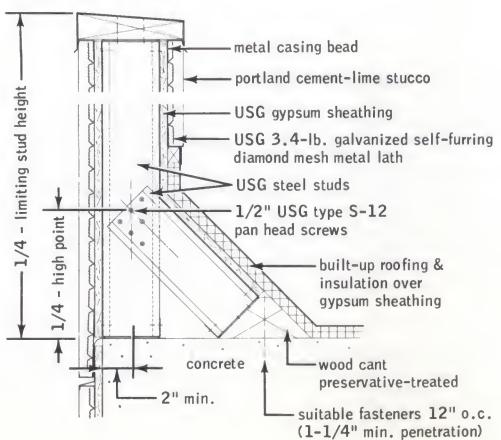


horizontal flashing control joint



elevation-control joint intersection

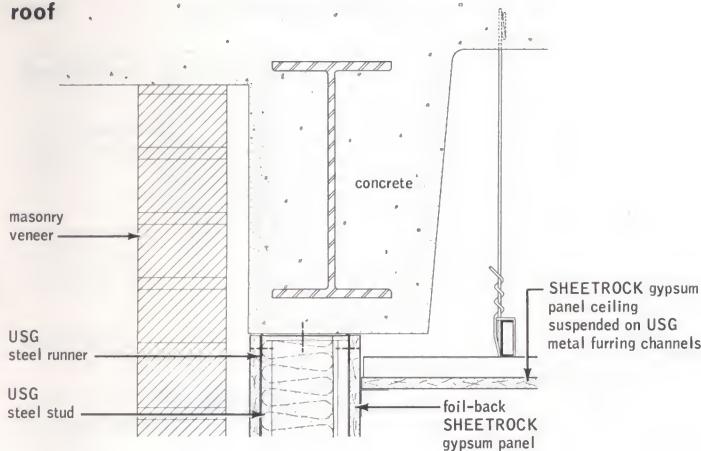
parapet



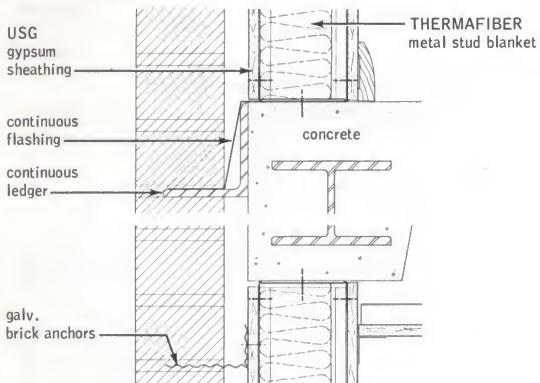
details/steel stud assembly

exterior masonry veneer/steel frame

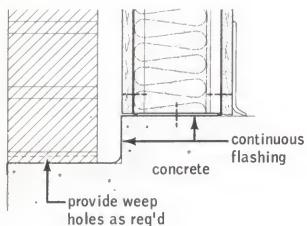
roof



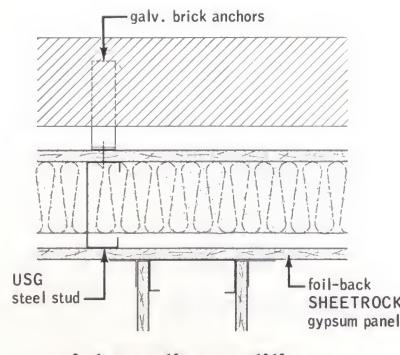
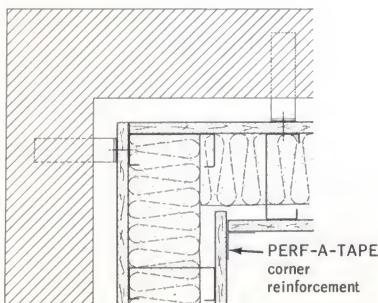
intermediate floor



foundation

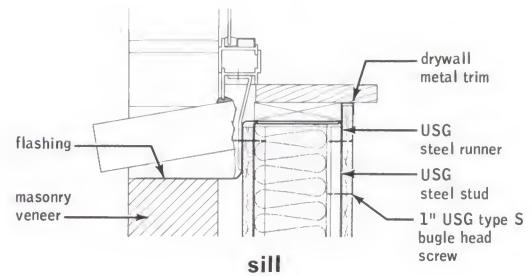
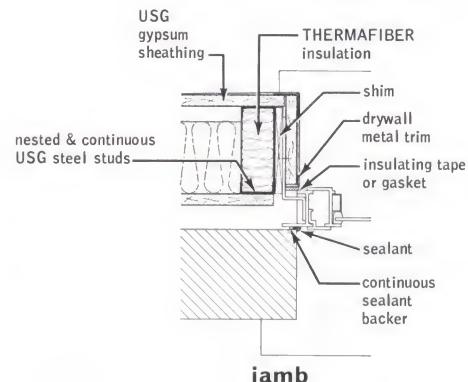
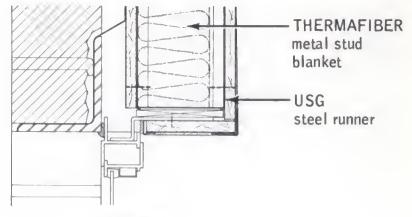


wall plan sections

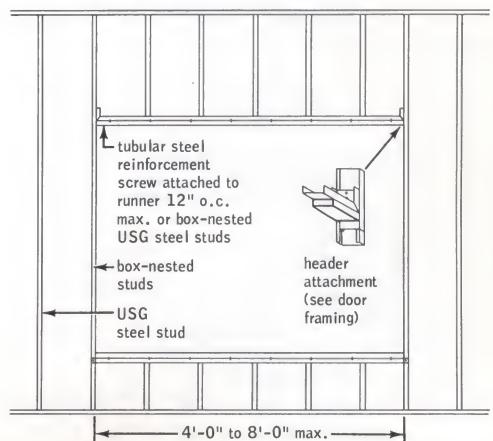


intersecting partition

window frame sections



wall elevation—window opening USG steel stud system

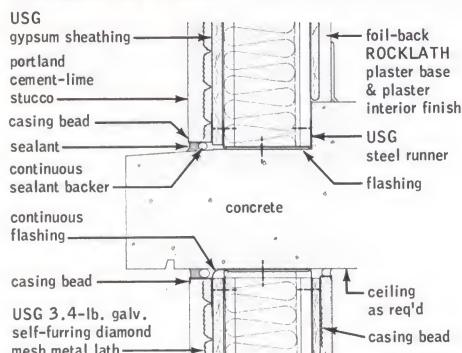


details/steel stud assembly

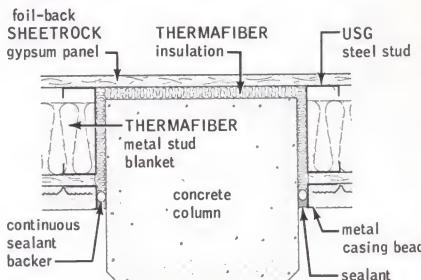
scale: 1½"=1'-0"

exterior stucco/concrete frame

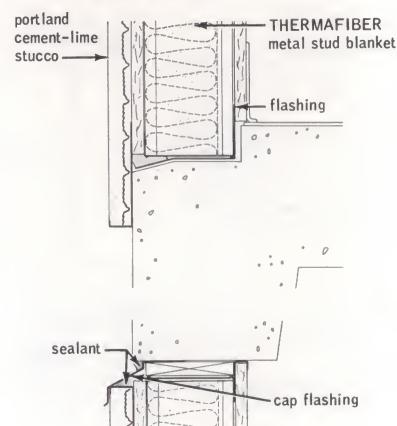
intermediate floor



column

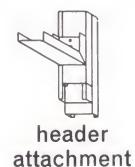
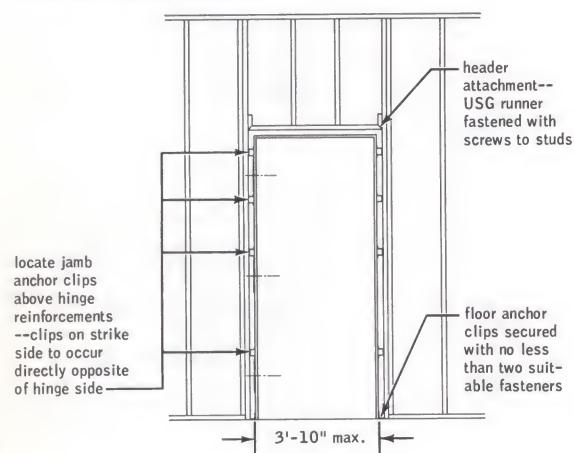


intermediate floor

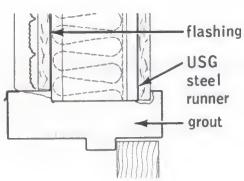
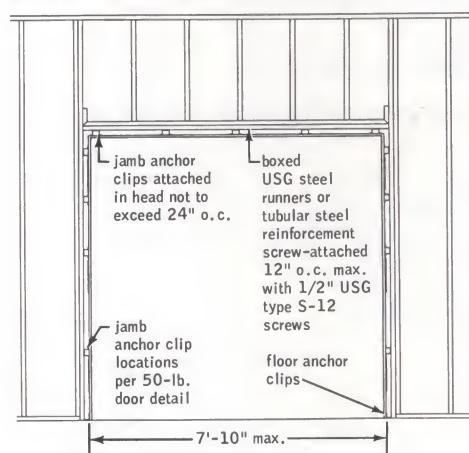


door frames

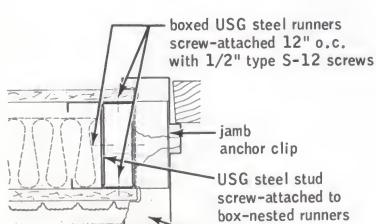
wall elevation—50-lb. door max.
USG steel stud system



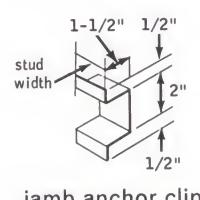
wall elevation—200-lb. doors
USG steel stud system



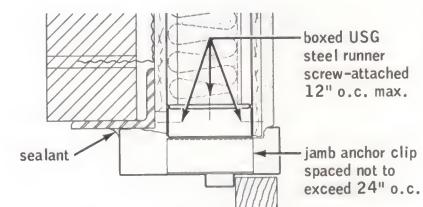
head
50-lb. door



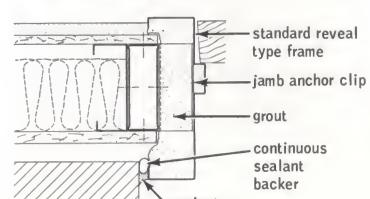
jamb
50-lb. door



jamb anchor clip



head
50 to 200-lb. door

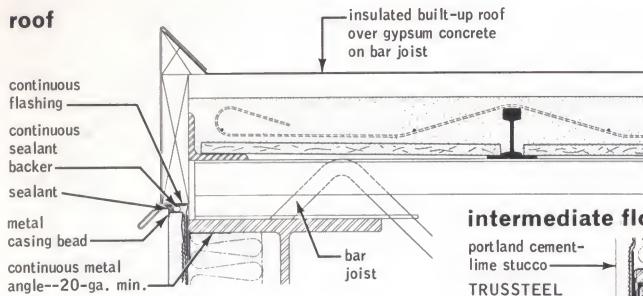


jamb
50 to 200-lb. door

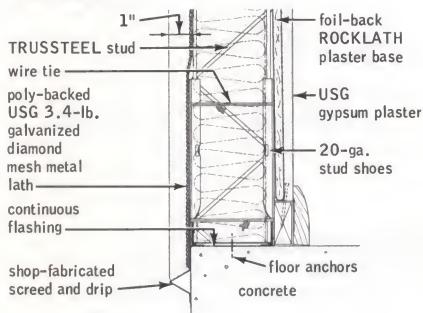
details/truss stud assembly

exterior stucco/steel frame

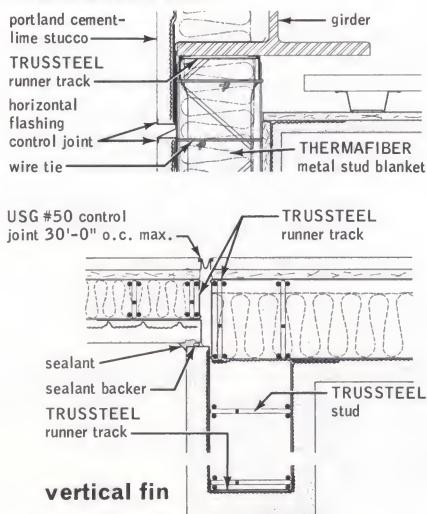
roof



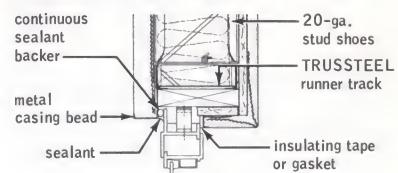
foundation



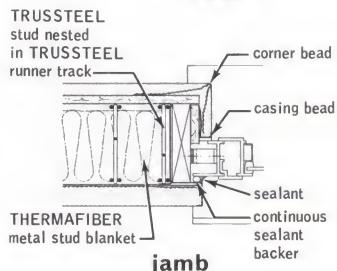
intermediate floor



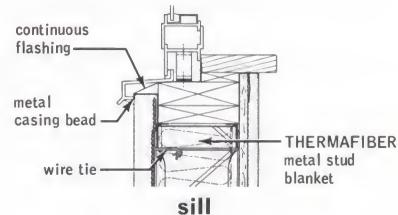
window frame sections



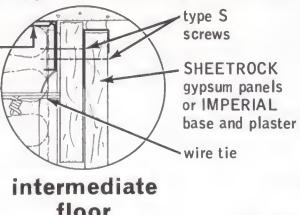
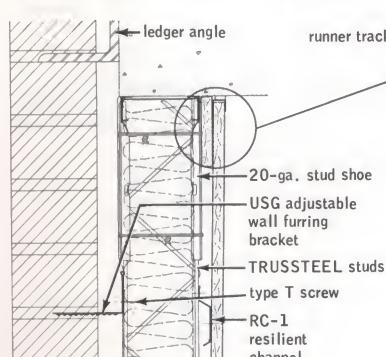
head



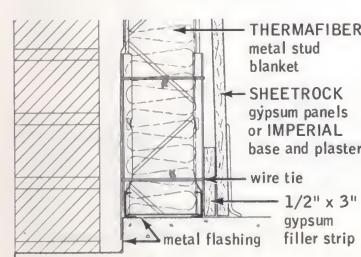
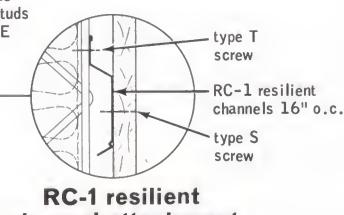
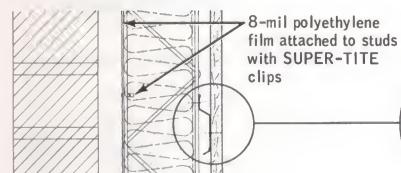
jamb



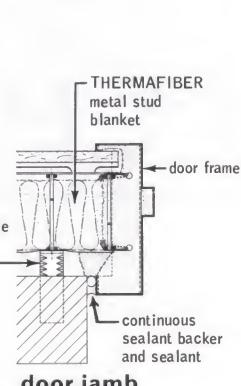
exterior masonry veneer/concrete frame



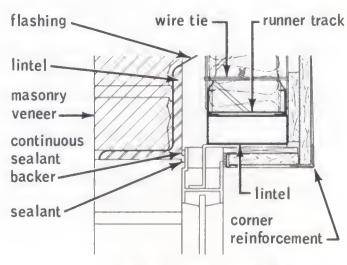
intermediate floor



foundation

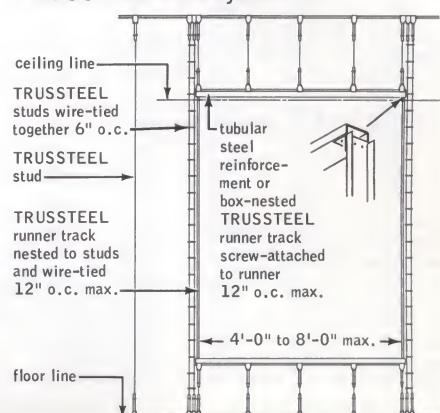


door jamb



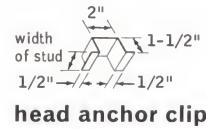
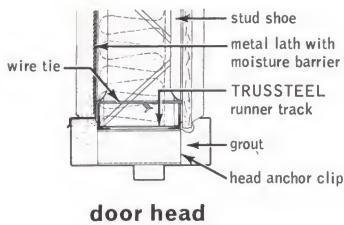
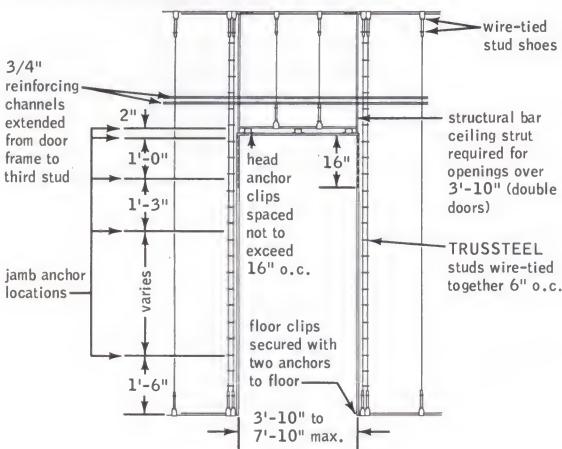
window head

wall elevation—window opening TRUSSTEEL stud system

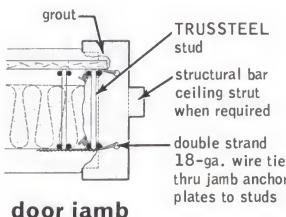
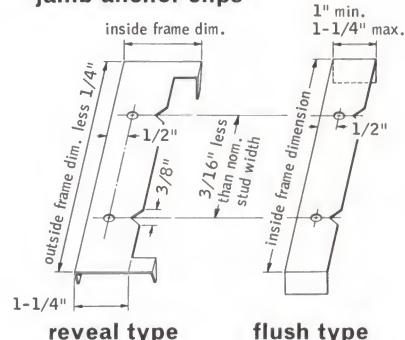


details/truss stud assembly

wall elevation—cross section thru door frame TRUSSTEEL stud system



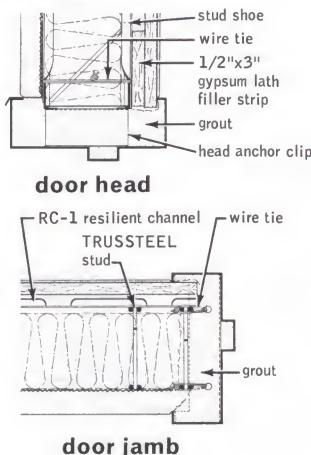
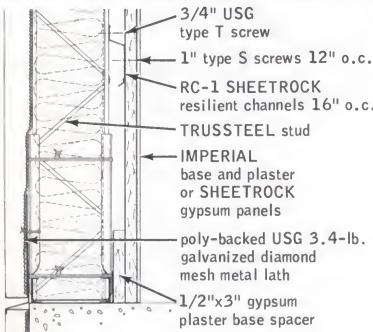
jamb anchor clips



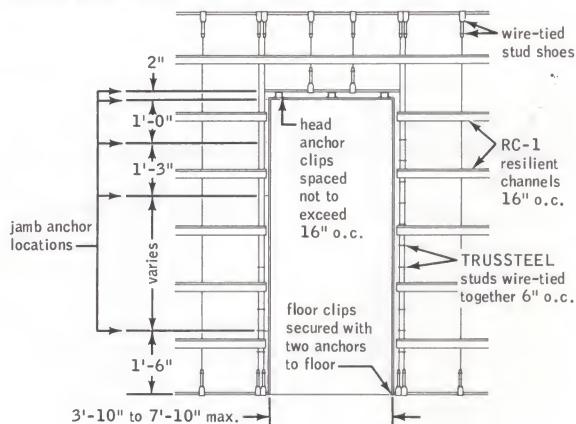
door jamb

details/various assemblies

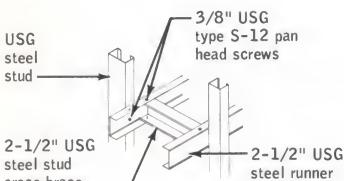
resilient attachment to TRUSSTEEL studs



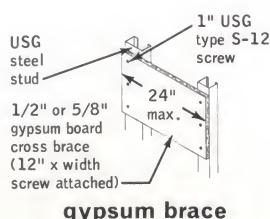
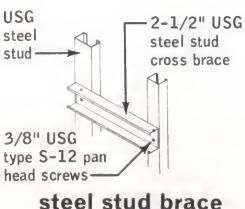
elevation—resilient attachment cross section thru frame



chase wall bracing

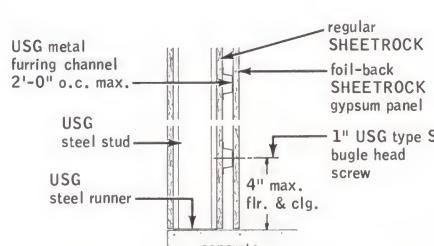


steel stud & runner brace

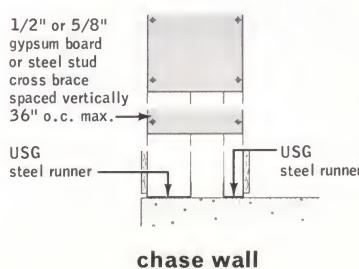


steel stud brace

gypsum brace

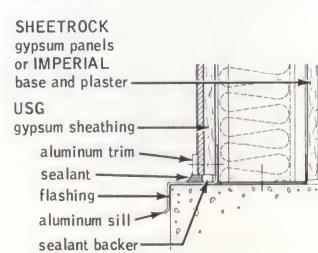
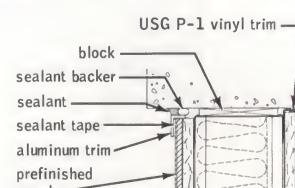


furred wall



chase wall

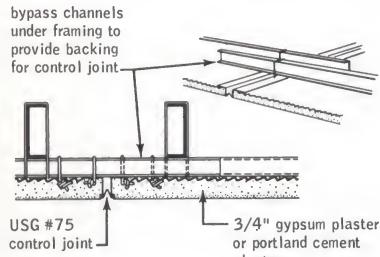
prefinished panel on USG steel studs



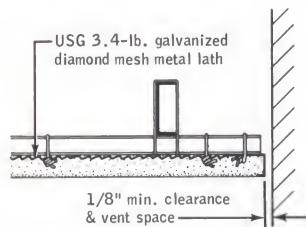
details/technical data

USG curtain wall systems

metal lath & plaster

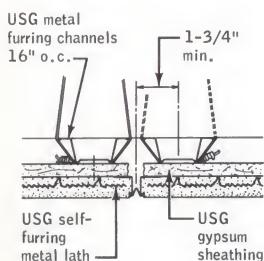


control joint

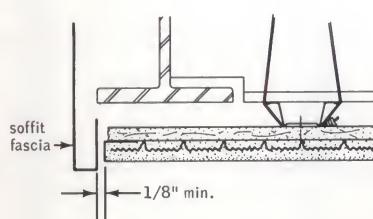


perimeter relief

gypsum lath & plaster



control joint



perimeter relief

thermal properties

stud system	wall type	stud sizes	insulation thickness (in.)	thermal transmittance(1)	
				R	U
20-ga. USG Steel & USG Light Steel Studs	Stucco Exterior—Plaster or Drywall Interior	2", 2½", 3½", 3¾", 4", 5½", 6", 7½"	0	4.41	.23
		3½", 3¾", 4", 5½", 6", 7½"	2	11.81	.08
		3½", 3¾", 4", 5½", 6", 7½"	3	15.55	.06
		4", 5½", 6", 7½"	3½	17.81	.06
	Masonry Exterior—Plaster or Drywall Interior	2", 2½", 3½", 3¾", 4", 5½", 6", 7½"	0	5.62	.18
		3½", 3¾", 4", 5½", 6", 7½"	2	12.96	.08
		3½", 3¾", 4", 5½", 6", 7½"	3	16.76	.06
		4", 5½", 6", 7½"	3½	19.02	.05
TRUSSTEEL Stud	Stucco Exterior—Plaster or Drywall Interior	2½", 3¼", 4", 6"	0	4.41	.23
		3¼", 4", 6"	2	11.93	.08
		3¼", 4", 6"	3	15.55	.06
	Masonry Exterior—Plaster or Drywall Interior	2½", 3¼", 4", 6"	0	4.36	.23
		3¼", 4", 6"	2	11.54	.09
		3¼", 4", 6"	3	15.54	.06

(1) Values based on actual air space thickness.

physical properties

stud system	dimension				metal thickness t**	net area sq. in.*	wt. lb. per lin. ft.
	A	B	C	D			
20-ga. USG Steel Studs	2"	1.250	1.406	0.438	0.0359	0.187	0.613
	2½"	1.250	1.406	0.438	0.0359	0.205	0.760
	3"	1.250	1.406	0.438	0.0359	0.223	0.762
	3¾"	1.250	1.406	0.438	0.0359	0.245	0.920
	4"	1.250	1.406	0.438	0.0359	0.259	0.960
	6"	1.250	1.406	0.438	0.0359	0.331	1.230
USG Light Steel Studs	35ST8	3.448	1.606	1.724	0.500	0.0322	.217 .846
	35ST10	3.448	1.606	1.724	0.500	0.0382	.262 .995
	35ST13	3.448	1.606	1.724	0.500	0.0486	0.338 1.255
	35ST16	3.421	1.552	1.724	0.625	0.0635	0.453 1.705
	35ST20	3.421	1.552	1.724	0.625	0.0785	0.558 2.110
	55ST8	5.448	1.606	1.724	0.500	0.0322	0.278 1.094
TRUSSTEEL Studs	55ST10	5.448	1.606	1.724	0.500	0.0382	0.335 1.290
	75ST8	7.448	1.606	1.724	0.500	0.0322	0.334 1.320
	75ST10	7.448	1.606	1.724	0.500	0.0382	0.404 1.558
	75ST13	7.448	1.606	1.724	0.500	0.0486	0.524 1.970
	75ST16	7.421	1.552	1.724	0.625	0.0635	0.707 2.630
	75ST20	7.421	1.552	1.724	0.625	0.0785	0.875 3.230
stud width-in.	wire thick.-in.	horiz. pipe clearance-in.	percent open area		wt. lb./lin. ft.		
2½	.177	1 13/16	79		.455		
3½	.177	2 5/8	84		.470		
4	.177	2 5/8	87		.485		
6	.177	3 1/4	91		.515		

*Excluding galvanized coating.

**Including galvanized coating.

structural properties

stud system	stud	I _x in ⁴	S _x in ³	R _x in	I _y in ⁴	S _y in ³	R _y in
20-ga. USG Steel Studs (1)	2"	0.126	0.123	0.820	0.050	0.048	0.510
	2½"	0.210	0.164	1.012	0.052	0.055	0.507
	3"	0.320	0.209	1.197	0.055	0.056	0.501
	3¾"	0.497	0.269	1.422	0.056	0.056	0.493
	4"	0.626	0.307	1.553	0.057	0.057	0.487
	6"	0.864	0.396	2.076	0.060	0.057	0.463
USG Light Steel Studs (1)	35ST8	0.422	0.242	1.395	0.085	0.075	0.627
	35ST10	0.506	0.291	1.391	0.101	0.088	0.620
	35ST13	0.649	0.372	1.385	0.125	0.110	0.609
	35ST16	0.835	0.478	1.358	0.167	0.151	0.606
	35ST20	1.017	0.582	1.349	0.195	0.176	0.591
	55ST8	1.222	0.445	2.098	0.100	0.079	0.218
TRUSSTEEL Studs (2)	55ST10	1.469	0.535	2.094	0.119	0.094	0.595
	75ST8	2.570	0.686	2.772	0.110	0.082	0.573
	75ST10	3.092	0.825	2.767	0.130	0.097	0.567
	75ST13	3.986	1.063	2.758	0.162	0.121	0.557
	75ST16	5.267	1.401	2.730	0.220	0.168	0.558
	75ST20	6.467	1.720	2.718	0.260	0.198	0.545
TRUSSTEEL Studs (2)	2½"	0.132	0.106	1.162	.0033	.0123	.1824
	3¼"	0.231	0.142	1.537	.0033	.0123	.1824
	4"	0.365	0.183	1.916	.0033	.0123	.1824
	6"	0.831	0.277	2.912	.0033	.0123	.1824

(1) Maximum allowable flexural stress: 20,000 psi.

(2) Maximum allowable flexural stress: 30,000 psi.

limiting height/stucco exterior

limiting height, 20-ga. USG steel stud and runner fastener spacing—drywall, plaster and chase wall interior

stud size →		2" stud		2½" stud		3" stud		3½" stud		4" stud		6" stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height										
12	15	24	12'0"	22	13'6"	19	15'9"	18	16'6"	17	17'6"	14	21'6"
	20	22	10'6"	18	12'3"	16	13'9"	15	15'0"	14	16'0"	11	19'6"
	25	20	9'3"	16	11'0"	15	12'3"	13	14'0"	12	14'9"	10	18'0"
	30	18	8'6"	15	10'0"	13	11'3"	12	12'9"	11	13'9"	9	17'0"
	35	16	8'0"	14	9'3"	12	10'3"	11	11'9"	10	12'9"	8	15'9"
	40	15	7'6"	13	8'9"	11	9'9"	10	11'0"	9	11'9"	7	14'9"
16	15	24	10'6"	24	12'3"	22	13'9"	19	15'9"	18	16'6"	15	20'3"
	20	24	9'0"	21	10'9"	19	11'9"	17	13'6"	15	14'6"	12	18'0"
	25	23	8'0"	19	9'6"	17	10'6"	15	12'3"	14	13'0"	11	16'0"
	30	20	7'6"	17	8'9"	15	9'9"	14	11'0"	13	11'9"	10	14'9"
	35	19	6'9"	16	8'0"	14	9'0"	12	10'3"	12	11'0"	10	12'9"
	40	17	6'6"	15	7'6"	14	8'3"	12	9'6"	11	10'3"	10	11'3"
24	15	24	8'6"	24	10'0"	24	11'3"	24	12'9"	22	13'9"	18	17'0"
	20	24	7'6"	24	8'9"	23	9'9"	21	11'0"	19	11'9"	15	14'9"
	25	24	6'6"	23	7'9"	21	8'6"	18	10'0"	17	10'6"	15	12'0"
	30	24	6'0"	22	7'0"	19	7'9"	17	9'0"	15	9'9"	15	10'0"
	35	24	5'6"	20	6'6"	18	7'3"	15	8'6"	15	8'6"	15	8'6"
	40	22	5'3"	18	6'3"	17	6'9"	15	7'6"	15	7'6"	15	7'6"

limiting height, USG light steel stud and runner fastener spacing—drywall and plaster interior

stud size →		35ST8 stud		35ST10 stud		35ST13 stud		35ST16 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	19	16'0"	15	16'6"	15	17'3"	15	18'0"
	20	14	14'6"	14	15'0"	14	15'9"	11	16'6"
	25	11	13'0"	11	13'9"	11	14'6"	11	15'3"
	30	12	12'0"	9	13'0"	9	13'9"	9	14'3"
	35	11	11'0"	8	12'3"	8	13'0"	8	13'9"
	40	9	10'3"	9	11'3"	7	12'6"	7	13'0"
16	15	19	14'9"	19	15'6"	15	16'3"	15	17'3"
	20	14	12'9"	14	14'0"	14	14'9"	14	15'6"
	25	15	11'3"	11	12'6"	11	13'9"	11	14'6"
	30	12	10'3"	12	11'3"	12	12'9"	9	13'6"
	35	11	9'6"	11	10'6"	11	12'0"	8	13'0"
	40	9	9'0"	9	9'9"	9	11'3"	7	12'6"
24	15	24	12'0"	19	13'3"	19	14'3"	19	15'0"
	20	18	10'3"	18	11'3"	14	12'9"	14	13'6"
	25	15	9'3"	15	10'3"	15	11'6"	11	12'9"
	30	12	8'3"	12	9'3"	12	10'6"	12	12'0"
	35	17	7'0"	11	8'6"	11	9'9"	11	11'0"
	40	14	6'3"	14	7'6"	9	9'0"	9	10'3"

stud size →		35ST20 stud		55ST8 stud		55ST10 stud		75ST8 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	15	18'9"	13	21'0"	13	21'9"	10	25'9"
	20	11	17'0"	11	19'0"	11	19'9"	9	23'3"
	25	11	15'9"	9	17'9"	9	18'3"	9	20'0"
	30	9	15'0"	7	16'3"	7	17'3"	7	16'6"
	35	8	14'3"	8	14'3"	6	16'6"	8	14'3"
	40	7	13'6"	7	12'6"	7	15'0"	7	12'6"
16	15	15	17'9"	15	19'9"	13	20'6"	13	24'3"
	20	11	16'3"	11	17'3"	11	18'9"	11	18'9"
	25	11	15'0"	11	15'0"	9	17'0"	11	15'0"
	30	9	14'3"	9	12'6"	9	15'0"	9	12'6"
	35	8	13'6"	11	10'9"	8	12'9"	11	10'9"
	40	7	12'9"	9	9'3"	9	11'3"	9	9'3"
24	15	19	15'6"	15	16'3"	15	17'9"	15	16'6"
	20	14	14'3"	14	12'6"	14	15'0"	14	12'6"
	25	11	13'0"	15	10'0"	15	12'0"	15	10'0"
	30	9	12'3"	12	8'3"	12	10'0"	12	8'3"
	35	11	11'9"	17	7'0"	11	8'6"	17	7'0"
	40	9	11'3"	14	6'3"	14	7'6"	14	6'3"

stud size →		75ST10 stud		75ST13 stud		75ST16 stud		75ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	10	26'9"	9	28'3"	9	30'0"	9	31'3"
	20	8	24'3"	8	25'6"	8	27'3"	7	28'6"
	25	7	22'6"	7	23'9"	6	25'3"	6	26'6"
	30	7	20'0"	6	22'6"	6	23'9"	5	24'9"
	35	8	17'3"	5	21'3"	5	22'6"	5	23'6"
	40	7	15'0"	5	20'0"	4	21'6"	4	22'6"
16	15	10	25'3"	13	26'6"	9	28'3"	9	29'6"
	20	9	22'6"	8	24'3"	8	25'6"	8	26'9"
	25	9	18'0"	7	22'6"	7	23'9"	6	24'9"
	30	9	15'0"	7	20'0"	6	22'3"	6	23'3"
	35	8	12'9"	6	17'3"	5	21'3"	5	22'3"
	40	9	11'3"	7	15'0"	5	18'9"	4	21'9"
24	15	15	20'0"	13	23'3"	10	24'6"	10	25'9"
	20	14	15'0"	11	20'0"	9	22'3"	9	23'3"
	25	15	12'0"	11	16'0"	9	20'0"	7	22'3"
	30	12	10'0"	12	13'3"	9	16'6"	6	20'6"
	35	11	8'6"	11	11'6"	8	14'3"	6	17'9"
	40	14	7'6"	9	10'0"	7	12'6"	7	15'6"

limiting height/masonry exterior

limiting height, 20-ga. USG steel stud and runner fastener spacing—drywall, plaster and chase wall interior

stud size →		2" stud		2½" stud		3" stud		3½" stud		4" stud		6" stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height										
12	15	24	10'3"	24	10'0"	24	11'6"	24	11'3"	23	13'0"	21	14'3"
	20	22	10'3"	23	10'0"	20	11'6"	20	11'3"	17	13'0"	16	14'3"
	25	20	9'3"	18	10'0"	16	11'6"	16	11'3"	14	13'0"	13	14'3"
	30	18	8'6"	15	10'9"	13	11'3"	13	11'3"	11	13'0"	10	14'0"
	35	16	8'0"	14	9'3"	12	10'3"	11	11'3"	10	12'6"	9	14'0"
	40	15	7'6"	13	8'9"	11	9'9"	10	11'0"	9	11'9"	8	13'3"
16	15	24	10'0"	24	9'9"	24	11'0"	24	10'9"	24	12'3"	23	13'3"
	20	24	9'0"	23	9'9"	21	11'0"	21	10'9"	18	12'3"	17	13'3"
	25	23	8'0"	19	9'6"	17	10'6"	17	10'9"	15	12'3"	13	13'3"
	30	20	7'6"	17	8'9"	15	9'9"	14	10'9"	13	11'9"	11	13'3"
	35	19	6'9"	16	8'0"	14	9'0"	12	10'3"	12	10'9"	9	12'3"
	40	17	6'6"	15	7'6"	14	8'3"	12	9'6"	11	10'0"	9	11'3"
24	15	24	8'6"	24	8'6"	24	9'9"	24	9'6"	24	10'9"	24	11'6"
	20	24	7'6"	24	8'6"	23	9'9"	24	9'6"	21	10'9"	20	11'6"
	25	24	6'6"	23	7'9"	21	8'6"	19	9'6"	17	10'6"	16	11'6"
	30	24	6'0"	22	7'0"	19	7'9"	17	9'0"	16	9'6"	13	10'0"
	35	24	5'6"	20	6'6"	18	7'3"	15	8'6"	15	8'6"	12	8'6"
	40	22	5'3"	18	6'3"	17	6'9"	15	7'6"	15	7'6"	11	7'6"

limiting height, USG light steel stud and runner fastener spacing—drywall and plaster interior

stud size →		35ST8 stud		35ST10 stud		35ST13 stud		35ST16 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	19	14'6"	19	14'9"	19	15'6"	19	16'3"
	20	14	13'3"	14	13'6"	14	14'0"	14	14'9"
	25	11	12'3"	11	12'6"	11	13'0"	11	13'9"
	30	12	11'6"	12	11'9"	9	12'3"	9	13'0"
	35	11	11'0"	11	11'3"	11	11'9"	8	12'3"
	40	9	10'3"	9	10'9"	9	11'3"	9	11'9"
16	15	19	14'0"	19	14'3"	19	14'9"	19	15'6"
	20	14	12'9"	14	13'0"	14	13'6"	14	14'0"
	25	15	11'3"	15	12'0"	11	12'6"	11	13'0"
	30	12	10'3"	12	11'3"	12	11'9"	9	12'3"
	35	11	9'6"	11	10'6"	11	11'3"	11	11'6"
	40	9	9'0"	9	9'9"	9	10'9"	9	11'0"
24	15	24	12'0"	19	12'6"	19	13'0"	19	13'6"
	20	18	10'3"	18	11'3"	18	11'9"	14	12'3"
	25	15	9'3"	15	10'3"	15	11'0"	15	11'3"
	30	12	8'3"	12	9'3"	12	10'3"	12	10'9"
	35	17	7'0"	11	8'6"	11	9'9"	11	10'3"
	40	14	6'3"	14	7'6"	9	9'0"	9	9'9"

stud size →		35ST20 stud		55ST8 stud		55ST10 stud		75ST8 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	15	17'0"	15	18'3"	15	19'0"	13	22'6"
	20	14	15'3"	11	16'9"	11	17'3"	9	20'6"
	25	11	14'3"	11	15'6"	11	16'0"	9	19'0"
	30	9	13'6"	9	14'6"	9	15'3"	7	16'6"
	35	8	12'9"	8	13'9"	8	14'6"	8	14'3"
	40	7	12'3"	7	12'6"	7	13'9"	7	12'6"
16	15	19	16'0"	15	17'6"	15	18'0"	13	21'0"
	20	14	14'6"	14	15'9"	14	16'3"	11	18'9"
	25	11	13'6"	11	14'9"	11	15'3"	11	15'0"
	30	9	12'9"	9	12'6"	9	14'3"	9	12'6"
	35	11	12'0"	11	10'9"	8	12'9"	11	10'9"
	40	9	11'6"	9	9'3"	9	11'3"	9	9'3"
24	15	19	14'0"	19	15'3"	19	15'9"	15	16'6"
	20	14	12'9"	14	12'6"	14	14'3"	14	12'6"
	25	15	11'9"	15	10'0"	15	12'0"	15	10'0"
	30	12	11'0"	12	8'3"	12	10'0"	12	8'3"
	35	11	10'6"	17	7'0"	11	8'6"	17	7'0"
	40	9	10'0"	14	6'3"	14	7'6"	14	6'3"

stud size →		75ST10 stud		75ST13 stud		75ST16 stud		75ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	13	23'6"	10	25'0"	10	26'9"	9	28'6"
	20	9	21'3"	9	22'9"	8	24'6"	8	25'9"
	25	9	19'9"	7	21'0"	7	22'9"	7	24'0"
	30	7	18'6"	7	19'9"	6	21'3"	6	22'6"
	35	6	17'3"	6	18'9"	5	20'3"	5	21'6"
	40	7	15'0"	5	18'0"	5	19'3"	4	20'6"
16	15	13	22'0"	13	23'3"	10	25'0"	10	26'3"
	20	11	20'0"	9	21'0"	9	22'6"	9	23'9"
	25	9	18'0"	9	19'6"	7	21'0"	7	22'3"
	30	9	15'0"	7	18'6"	7	19'9"	6	20'9"
	35	8	12'9"	6	17'3"	6	18'9"	6	19'9"
	40	9	11'3"	7	15'0"	5	18'0"	5	19'0"
24	15	15	19'3"	13	20'3"	13	21'9"	13	23'0"
	20	14	15'0"	11	18'6"	11	19'9"	11	20'9"
	25	15	12'0"	11	16'0"	9	18'3"	9	19'3"
	30	12	10'0"	9	13'3"	7	16'6"	7	18'3"
	35	11	8'6"	11	11'6"	8	14'3"	6	17'3"
	40	14	7'6"	9	10'0"	7	12'6"	7	15'6"

limiting height/stucco & masonry exterior

limiting height, TRUSSTEEL stud and runner fastener spacing—stucco exterior—plaster interior

stud size →		2½" stud		3¼" stud		4" stud		6" stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	24	10'3"	24	11'9"	22	13'6"	18	17'0"
	20	24	9'3"	21	10'9"	18	12'3"	14	15'6"
	25	21	8'9"	18	10'0"	16	11'3"	13	13'3"
	30	18	8'3"	16	9'6"	14	10'6"	14	11'0"
	35	17	7'9"	14	9'0"	13	9'6"	13	9'6"
	40	15	7'6"	14	8'3"	14	8'3"	14	8'3"
16	15	24	9'9"	24	11'3"	24	12'6"	19	16'0"
	20	24	8'9"	23	10'0"	20	11'3"	18	12'6"
	25	22	8'3"	20	9'3"	18	10'0"	18	10'0"
	30	19	7'9"	18	8'3"	18	8'3"	18	8'3"
	35	18	7'0"	18	7'0"	18	7'0"	18	7'0"
	40	18	6'3"	18	6'3"	18	6'3"	18	6'3"

limiting height, TRUSSTEEL stud and runner fastener spacing—masonry exterior—veneer plaster or drywall on resilient channel interior

stud size →		2½" stud		3¼" stud		4" stud		6" stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	24	9'9"	24	10'3"	24	11'0"	24	12'9"
	20	23	9'9"	22	10'3"	21	11'0"	18	12'9"
	25	19	9'9"	18	10'3"	16	11'0"	14	12'9"
	30	16	9'3"	15	9'9"	14	10'6"	14	11'0"
	35	15	8'9"	14	9'3"	13	9'6"	13	9'6"
	40	14	8'3"	14	8'3"	14	8'3"	14	8'3"
16	15	24	9'6"	24	10'0"	24	10'6"	24	12'3"
	20	24	9'6"	23	10'0"	22	10'6"	18	12'3"
	25	20	9'3"	18	10'0"	18	10'0"	18	10'0"
	30	18	8'3"	18	8'3"	18	8'3"	18	8'3"
24	15	24	8'6"	24	9'0"	24	9'6"	24	10'9"
	20	24	8'3"	24	8'3"	24	8'3"	24	8'3"

limiting height, TRUSSTEEL stud and runner fastener spacing—stucco exterior—veneer plaster or drywall on resilient channel interior

stud size →		2½" stud		3¼" stud		4" stud		6" stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height						
12	15	24	11'9"	22	13'6"	20	15'3"	15	19'6"
	20	21	10'9"	18	12'3"	16	14'0"	14	16'6"
	25	18	10'0"	16	11'6"	14	13'0"	13	13'3"
	30	16	9'3"	14	10'9"	14	11'0"	14	11'0"
	35	14	9'0"	13	9'6"	13	9'6"	13	9'6"
	40	14	8'3"	14	8'3"	14	8'3"	14	8'3"
16	15	24	11'3"	24	12'9"	21	14'6"	18	16'6"
	20	23	10'0"	20	11'6"	18	12'6"	18	12'6"
	25	20	9'3"	18	10'0"	18	10'0"	18	10'0"
	30	18	8'3"	18	8'3"	18	8'3"	18	8'3"
	35	18	7'0"	18	7'0"	18	7'0"	18	7'0"
	40	18	6'3"	18	6'3"	18	6'3"	18	6'3"

Limiting heights above are based on lowest height as determined from the following limiting criteria: bending stress, deflection and end reaction shear.

specifications — notes to architect

1. These specifications are for exterior non-load bearing curtain wall systems of 20-ga. USG Steel Studs, USG Light Steel Studs or TRUSSTEEL Studs and securely attached interior and exterior facings. Expand or alter as necessary for project specifications. For more product and installation information on interior and exterior finishes and accessories, see appropriate U.S.G. product folders in this series: Gypsum Plasters, Plaster Bases & Accessories, Gypsum Panels & Accessories, Insulation Products and Paint Products.

2. Maximum allowable wall heights, stud spacings, and runner attachment spacings are shown in Technical Data tables, pages 12 through 14. Select values and insert in the specifications. Brick veneer must be structurally supported at every floor.

3. **Shadowing and Spotting**—During periods of low outside temperature, condensation may form on outside walls, collecting airborne dirt to produce shadowing and spotting over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternates should be considered:

a. The interior facing of Foil-Back SHEETROCK SW Panels should be furred from the studs using a base layer of panels screw-attached to the studs and horizontally applied USG Metal Furring Channels or RC-1 Resilient Channels spaced 24" o.c. (see details, page 10).

b. For maximum resistance to shadowing and spotting, a separate chase wall construction is recommended using studs that are independent of the exterior studs and membrane (see details, page 10).

4. **Expansion and Contraction**—Curtain wall surfaces should be isolated with control joints or other means where: (a) curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling; (b) construction changes within the plane of the wall; (c) stucco surfaces exceed 10' in either direction; (d) the area

USG curtain wall systems

within stucco sections exceeds 100 sq. ft.; (e) the basic construction contains a control joint; (f) interior partition run exceeds 30'. Ceiling-height door and window frames may be used as control joints, as may less-than-ceiling height frames if control joints extend to the ceiling and floor from both corners.

Sheathing should be broken behind control joints. Where vertical and horizontal joints intersect, the horizontal joint should be continuous and the vertical joint should abut it. Splices, terminals and intersections should be caulked with a sealant.

5. Air and Water Infiltration—*Flashing and sealants as shown in the details should be provided to resist air and water infiltration. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c.*

6. Corrosive Materials—*USG Control Joints and other USG Metal Accessories should not be used with magnesium oxy-chloride cement stuccos or stuccos containing calcium chloride additives.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during the period of gypsum panel and joint finishing or lath and plaster application, temperatures within the building shall be maintained uniformly within the range of 55°F. Adequate ventilation shall be provided to eliminate excessive moisture within the building during this period.

1.5 certificates of compliance

Prior to shipping any exterior curtain wall material to the site, the Contractor shall submit to the Architect copies of manufacturer's certificates showing compliance with the air and water infiltration standards set by NAAMM at the specified wind velocity. All certificates shall be issued by an independent testing laboratory.

Part 2: products

2.1 materials manufactured by United States Gypsum

a. Studs and Runners—

1. 20-ga. USG Steel Studs and Runners—Nos. 20ST10 (2"), 212ST10 (2½"), 30ST10 (3"), 358ST10 (3½"), 40ST10 (4"), 60ST10 (6").
2. USG Light Steel Studs and Runners—Stud Nos. 35ST8 (3½"), 35ST10 (3½"), 35ST13 (3½"), 35ST16 (3½"), 35ST20 (3½"), 55ST8 (5½"), 55ST10 (5½"), 75ST8 (7½"), 75ST10 (7½"), 75ST13 (7½"), 75ST16 (7½"), 75ST20 (7½"); and Runner Nos. 35CR8 (3½"), 35CR10 (3½"), 35CR13 (3½"), 55CR8 (5½"), 55CR10 (5½"), 75CR8 (7½"), 75CR10 (7½"), 75CR13 (7½"). (CR13 runner styles are used with ST16 and ST20 stud styles.)
3. TRUSSSTEEL Studs and Runners—widths (2½"), (3¼"), (4"), (6"); 20-ga. TRUSSSTEEL Stud Shoes.
4. Standard USG Steel Studs and Runners—Nos. 158ST5 (1½"), 212ST5 (2½"), 358ST5 (3½"), for interior chase wall.
5. USG Metal Furring Channel, for furred interior wall.
6. RC-1 SHEETROCK Resilient Channel, for resiliently attached interior wall.
- b. Sheathing—USG Gypsum Sheathing—½" thick, (2'x8') (4'x8').

c. Insulation—

1. THERMAFIBER Metal Stud Insulating Blankets—(2") (3") (3½") thick, (16") (24") wide x (48") (96") long.
2. THERMAFIBER Sound Attenuation Blankets—(1½") (2") thick, x (16"x48") (24"x48"). (*Use where noncombustibility is required. Specify foil-back interior gypsum panels or lath as vapor barrier.*)

d. Gypsum Panels—

1. Face Boards—Foil-Back SHEETROCK SW Gypsum Panels (½") (⅜") thick, 48" wide, lengths as required.
2. Backing Boards—Regular SHEETROCK Gypsum Panels (½") (⅜") thick, 48" wide, lengths as required (*for furred wall construction*).

e. Plaster Base—

1. Foil-Back ROCKLATH Plaster Base (*for standard plasters*) ¾" thick, (16" x 48") (16" x lengths as required).
2. Foil-Back IMPERIAL Plaster Base (*for veneer plasters*) ½" thick, 48" wide, lengths as required.

f. Plasters for Interior Surfaces

1. Standard Plasters and Finishes
 - a. RED TOP Gypsum Plaster (100:2).
 - b. RED TOP Wood Fiber Plaster (100:1).
 - c. STRUCTO-BASE Gypsum Plaster (100:2).
 - d. STRUCTO-GAUGE Gauging Plaster and IVORY Lime (1:1 or 1:2).
 - e. RED TOP Keenes Cement and IVORY Lime (4:1 or 2:1).

2. Veneer Plasters and Finishes

- a. IMPERIAL Plaster Finish (*single-coat system*).
- b. IMPERIAL Plaster Basecoat (*two-coat system; specify finish plaster from d or e above*).

g. Metal Lath—3.4-lb. USG Galvanized (Self-Furring) (Poly-Backed) Junior Diamond Mesh Lath 27" x 96".

h. USG Brand Screws and Clips—

1. (1") (1¼") (1½") Type S-12, Bugle Head.
2. ¾" Type S-12, Pan Head.
3. 1" Type S, Bugle Head, *for standard USG steel components*.
4. ¾" Type T, Pan Head.
5. SUPER-TITE Clip.

i. Lathing Accessories—(*specify from Plaster Base & Accessories folder SA-917; specify 1" grounds; 1" casing beads not available from U.S.G.*)

j. Exterior Stucco—ORIENTAL Exterior Stucco.

k. Drywall Accessories—(*specify from U.S.G. Folder SA-927*).

l. Joint Treatment—(*specify from U.S.G. Folder SA-927*).

2.2 materials by other manufacturers

- a. Portland-Cement Stucco—Mixed in accordance with ANSI A42.2, Type L to the following proportions: scratch coat—1 bag cement: ¾ bag lime: 5 to 6 cu. ft. sand; brown coat—1 bag cement: 1 bag lime: 6 to 7 cu. ft. sand.
- b. Marblecrete Materials—(*specified by architect*) meeting requirements of local contractors' association and jurisdictional authorities (stucco applied to a full 1" thickness).
- c. Masonry Materials—
 1. Brick, face or common, and mortar materials (*specified by architect*).
 2. Brick anchors—corrugated 22-ga. hot-dipped galvanized sheet steel with sufficient cross-section to withstand 220 lbs. without exceeding yield point or breaking mortar bond.
- d. Runner Fasteners—power-driven type with ability to withstand 193 lbs. single shear and 200 lbs. bearing force when

USG curtain wall systems

driven into structural head or base and without exceeding allowable stress in runner, fastener or structural support.

- e. Polyethylene Film—8 mil thick, clear.

Part 3: execution

3.1 erection

3.1.1 studs and runners

a. Align runner track accurately according to exterior wall layout and secure to base and head with power-driven fastener spaced () (*choose spacing from Technical Data tables*).

b. Position steel studs vertically in runners and space no greater than (12") (16") (24") (*choose spacing from Technical Data tables*). Securely anchor each stud to runners with four $\frac{3}{8}$ " type S-12 pan head screws, two at top and two at bottom, with one screw in each flange.

c. Position TRUSSTEEL Studs vertically in runners and space no greater than (12") (16") (24") o.c. (*choose from Technical Data tables*). Securely anchor each stud to runners with four 20-ga. TRUSSTEEL Stud Shoes, two at top and two at bottom, wire-tied in place with two ties of double-strand 18-ga. wire.

d. For resilient attachment, position resilient channels horizontally spaced 16" o.c. and fasten to TRUSSTEEL Studs with $\frac{3}{4}$ " type T screw at each intersection.

e. For chase wall, align additional interior runners accurately at floor and ceiling and securely anchor with suitable fasteners spaced not more than 24" o.c. Position studs vertically in runners, spaced no greater than (12") (16") (24") o.c. and located no more than 2" from all door and window jambs abutting partitions, partition corners and other construction. Anchor all studs located adjacent to door and window frames, partition intersections and corners to runner flanges by positive screw engagement through stud and runner flanges.

3.1.2 exterior sheathing

Apply USG Gypsum Sheathing horizontally and screw-attach to exterior of each stud with 1" type S-12 screws spaced $\frac{3}{8}$ " from ends and edges and approx. 8" o.c. When stucco exterior will be applied, sheathing may be tacked in place, since later application of self-furring metal lath will complete sheathing anchorage. All sheathing tacked in this manner must be covered with metal lath immediately.

3.1.3 exterior metal lath and accessories

a. Apply metal lath with long dimension across supports, with ends lapped 1" and staggered in adjacent courses, sides lapped $\frac{1}{2}$ ". Screw-attach self-furring metal lath to metal studs and runners with 1 $\frac{1}{4}$ " type S-12 screws spaced 8" o.c. Fasten poly-backed lath to TRUSSTEEL Studs with SUPER-TITE clips 6" o.c. and with 18-ga. galvanized tie wire where sheets overlap.

b. Install USG Control Joint No. 100 where indicated on the drawings. Back control joints with 9" wide, No. 15 asphalt felt strips stapled to the sheathing. Install joints with flanges under self-furring lath and attach with Bostitch $\frac{9}{16}$ " "G" staples or equal, spaced 6" apart on each flange. Break supporting members and sheathing behind control joints. Apply sealant at all splices, intersections and terminals.

c. Apply polyethylene film with long dimension across truss studs, with ends lapped 2" over a stud and sides lapped 6". Fasten to TRUSSTEEL Studs with SUPER-TITE Clips or 18-ga. galvanized tie wire spaced 6" o.c.

d. Apply other lathing accessories per U.S.G. Folder SA-917.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, TRUSSTEEL, THERMAFIBER, FIRECODE, SHEETROCK, IMPERIAL, ROCKLATH, RED TOP, PERF-A-TAPE,

3.1.4 masonry materials

- a. Erect per architect's specifications and details.
- b. Anchor brick with masonry anchors spaced 24" o.c. vertically and screw-attached to each metal stud. Anchor other masonry units to each stud in a similar manner, 16" o.c. max. Anchor brick to truss studs with masonry anchors spaced 16" o.c. vertically and attached with type T screws.

3.1.5 insulation

Insert THERMAFIBER Metal Stud Blankets between studs and (staple to gypsum sheathing using $\frac{9}{16}$ " staples with divergent points placed at each corner and in the center of each blanket) (hold tightly against metal lath backing with taut horizontal tie wires spaced no more than 36" o.c.).

3.1.6 drywall interior

a. Position Foil-Back SHEETROCK SW Gypsum Panels vertically or horizontally and attach to studs with 1" type S-12 screws spaced 8" o.c.

b. For furred interior construction, apply regular SHEETROCK SW Gypsum Panels vertically or horizontally and attach to studs with 1" type S-12 screws 8" o.c. Over the first panel layer, apply USG Metal Furring Channels horizontally 24" o.c. and screw-attach through panels into metal studs. Attach each channel attachment flange to each stud with 1" type S-12 screws. Screw-attach a second layer of Foil-Back SHEETROCK SW Gypsum Panels to furring channels with 1" type S screws spaced 12" o.c.

c. For chase wall interior construction, space gypsum panel or steel stud cross braces not to exceed 48" o.c. vertically. Screw-attach gypsum braces to stud webs with three type S-12 screws or screw-attach steel stud and runner braces with $\frac{3}{8}$ " type S-12 screws. Apply Foil-Back SHEETROCK SW Gypsum Panels to interior stud row with 1" type S screws spaced 12" o.c.

d. For resilient interior construction, install a $\frac{1}{2}$ " thick x 3" wide gypsum strip to inside of floor and ceiling runner track and fasten with 1" type S screws spaced 24" o.c. Apply foil-back panels vertically and attach to resilient channels with 1" type S screws spaced 12" o.c. Fasten panels to track at floor and ceiling with 1 $\frac{1}{8}$ " type S screws.

e. Install drywall accessories, finish joints, accessories and screw heads per U.S.G. Folder SA-927.

3.1.7 standard lath and plaster interior

a. Apply Foil-Back ROCKLATH Plaster Base face out with long dimension across studs. Butt ends together over studs with joints staggered in successive courses. Attach lath to each (steel stud with 1" type S-12 screws spaced 8" o.c. and at least $\frac{3}{8}$ " from ends and edges) (TRUSSTEEL Stud with TRUS-LOK Field Clips, TL-1, and BRIDJOINT B-1 Field Clips at end joints of lath).

b. Install lathing accessories per U.S.G. Folder SA-917.

c. Apply gypsum sand basecoat and finish plaster per U.S.G. Folder SA-918.

3.1.8 veneer plaster interior

a. Apply Foil-Back IMPERIAL Plaster Base vertically or horizontally and attach to steel studs with 1" type S-12 screws spaced 8" o.c.

b. For resilient attachment, select section 3.1.6d above.

c. Install lathing accessories per U.S.G. Folder SA-917.

d. Apply IMPERIAL Plaster per U.S.G. Folder SA-918.

STRUCTO-BASE, STRUCTO-GAUGE, IVORY, ORIENTAL, SUPER-TITE, TRUS-LOK, BRIDJOINT, STRUCTO-LITE.

Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.



KINKEAD

float-away®
Closet Systems



A Subsidiary of **United States Gypsum Company**

8.11/K!

KINKEAD INDUSTRIES 1975-1 ■■■■■ 8 P SPECIAL DOORS
bi-fold doors

float-away Closet Systems all-steel bi-fold doors and shelves

Only with float-away... all these beauty and reliability features!

You can count the reasons for the popularity of this outstanding selection of all-steel closet systems. Smooth-gliding FLOAT-AWAY Closet Doors combine with color-matched side trim and adjustable shelves for clean decorative lines, complete reliability, low installed cost and minimum maintenance.

DISTINCTION BY DESIGN: Richly-sculptured FLOAT-AWAY Doors are deepformed for the look of expensive custom millwork. Adjustable, they allow for out-of-square construction and a $\frac{3}{4}$ " normal rug clearance. Luxurious panel designs ranging from classic to contemporary harmonize with room decor, provide elegant styling. The impressive depth of louvers and relief designs sets new standards of excellence and quality. Choice of standard or ceiling-high doors provides construction and decor options.

DURABILITY WHERE IT COUNTS: For eye-appeal and lasting protection, every FLOAT-AWAY Door is thoroughly bonderized, then completely plated—actually *electro-deposited*—with finest-quality enamel. Hard baking for 22 minutes (not 2 to 5) gives a beautiful, low-sheen Bone White coating that's exceptionally mar-resistant. Won't chip or crack even if the metal is hit sharply. All-over coating assures rust resistance even in hidden areas. Smooth matte finish is free from highlights or runs. Gleaming brass door pulls add deluxe quality touch. Pulls also available in antique bronze and satin aluminum.

LIFETIME CONSTRUCTION: For extra value, FLOAT-AWAY Bi-fold Doors and Shelves are fabricated from heavy 24-gauge cold-rolled enameled steel. High-strength, all-welded construction on doors assures trouble-free operation.

NOISELESS GLIDE: Superior engineering plus sound-dampening hardware give the finest in smooth, floating action. Doors glide open and closed quietly, effortlessly. Nylon-to-metal contacts plus sound-deadening material in back panel help eliminate noise. Sturdy hinges join panels for silent, smooth operation.

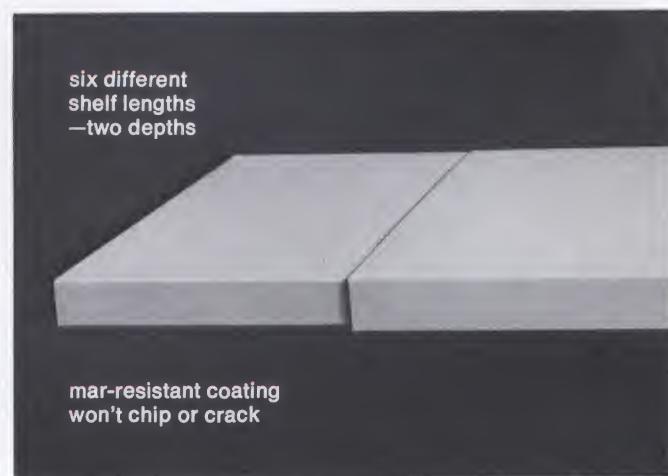
TWIN TRACKS: Identical top and bottom FLOAT-A-MATIC Guide Tracks can't cause confusion in installation. Made of rugged extruded aluminum, they won't deform if stepped on, provide permanently true tracks for free-floating action. What's more, the optional FLOAT-A-LEVEL top track compensates for irregularities in floors and ceilings. Bottom track allows door to open and close more rigidly—no shake, chatter, grab or twist like wooden or plastic doors. Nylon-tipped steel threaded guide pins assure extra quietness. Doors are full $1\frac{1}{8}$ " thick for superior sturdiness and quality appearance.

VERSATILE JAMB TRIM: Attractive jamb trim finishes opening for perfect installation without unsightly gaps at jambs. Choice of six widths—from 1" through $3\frac{1}{2}$ " in $\frac{1}{2}$ " increments—allows use of a standard door even if opening is oversize.

Here's PROOF of Value

- Quick installation
- Low cost (up to 50% less than wood)
- Decorator beauty
- Prefinished—complements every decor
- Adjustable height and width within opening
- Non-warping, no skin delamination, rust-resisting
- Quiet, effortless glide
- Permanent finish cleans easily—never needs paint

Matching Adjustable Shelves complete your closet system



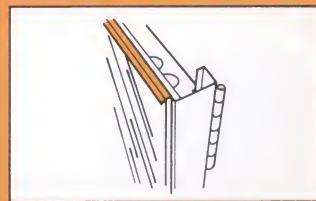
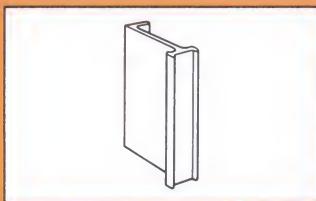
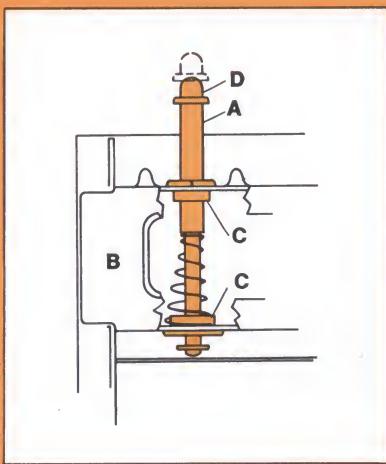
Sturdy steel shelves with mar-resistant enamel finish complement your FLOAT-AWAY Doors. See back cover.

Appealing Styles for All Interiors

Select the door of your choice from the following pages. Wide range of styling assures a perfect match for your decor—and each door features FLOAT-AWAY reliability.

Construction features of float-away Closet Doors

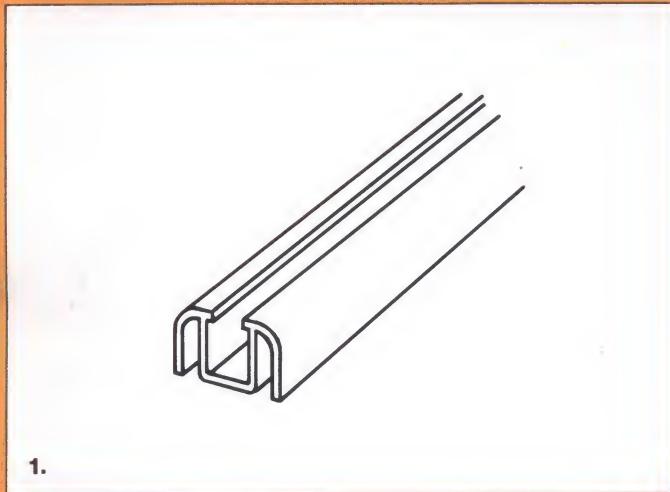
(A) Spring-loaded top pivot pins require no adjustment or tightening. (B) Stiffener braces at top and bottom have unique design that holds panels flush, reinforcing top and bottom edges against damage. (C) Nylon bushings in pivot and guide pin holes prevent wear, eliminate noise. (D) Nylon tips on guide pins assure smooth, silent operation.



Full mirror door handle features straight-line styling with full-finger grip for easy opening/closing. Choice of satin aluminum (standard) or satin gold finish.

Perfect-image glass with attractive pencil edges attaches securely with *double* mounting system: strong shock-absorbing tape and full width, top-and-bottom metal retainers.

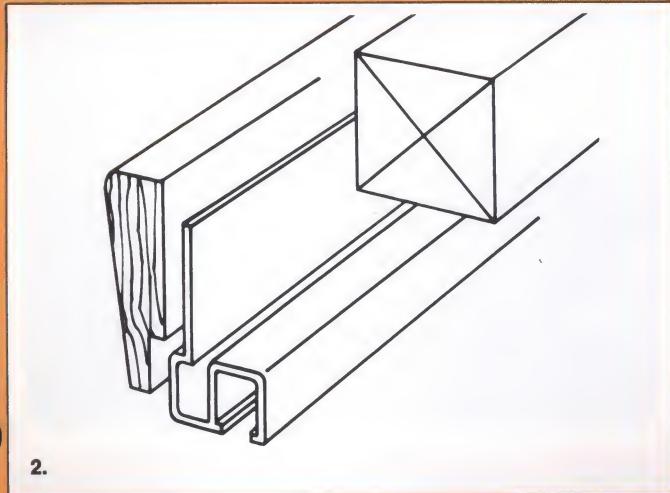
Versatile float-a-matic Tracks... meet all types of construction needs



1.

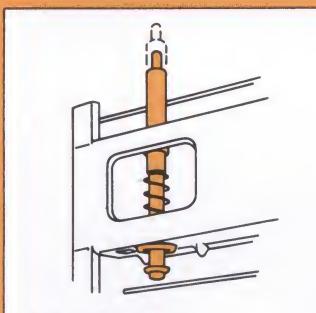
Extruded aluminum thresholds and top track with pivot bearings provide extra adjustment to meet any installation conditions.

float-a-level Track

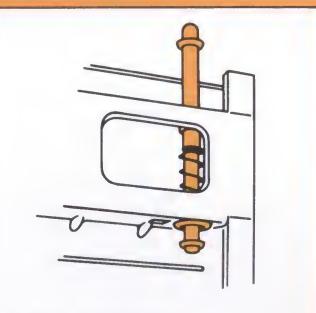


2.

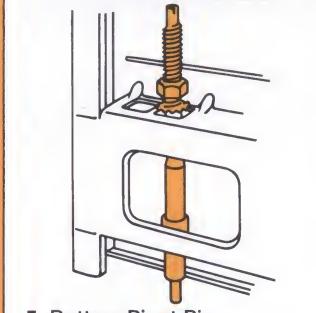
FLOAT-A-LEVEL Top Track of extruded aluminum solves problem of uneven floors and ceilings associated with poured concrete construction common to high-rise apartments and offices.



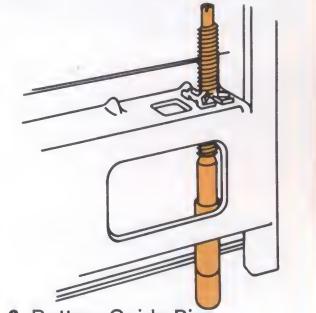
3. Top Pivot Pin
(spring-loaded)



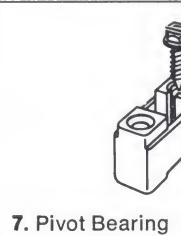
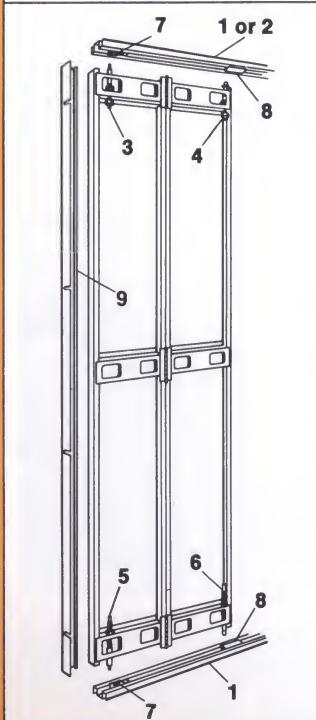
4. Top Guide Pin
(spring-loaded)



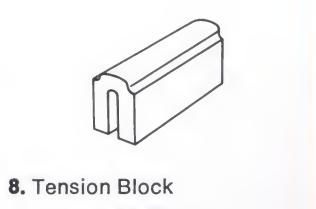
5. Bottom Pivot Pin
with Lock Nut (threaded)



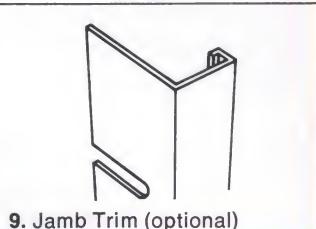
6. Bottom Guide Pin
(threaded)



7. Pivot Bearing

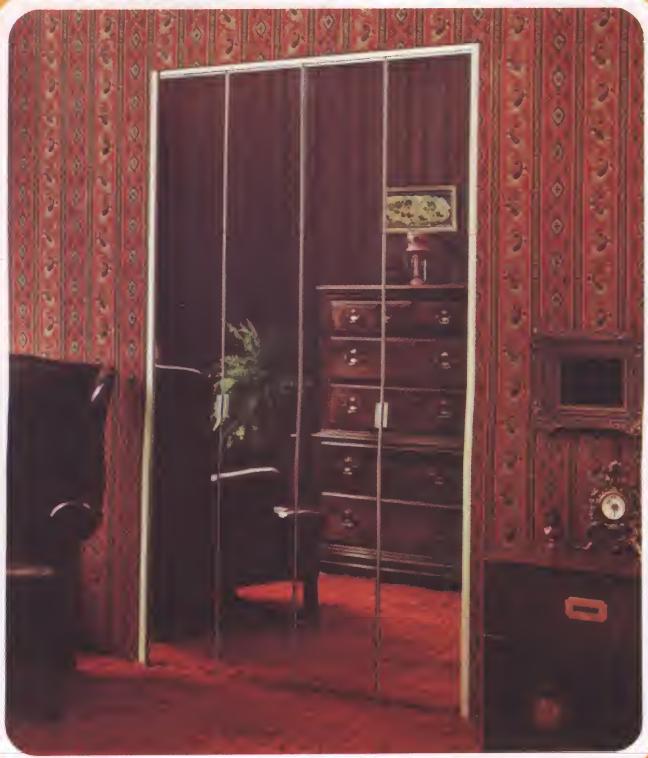


8. Tension Block

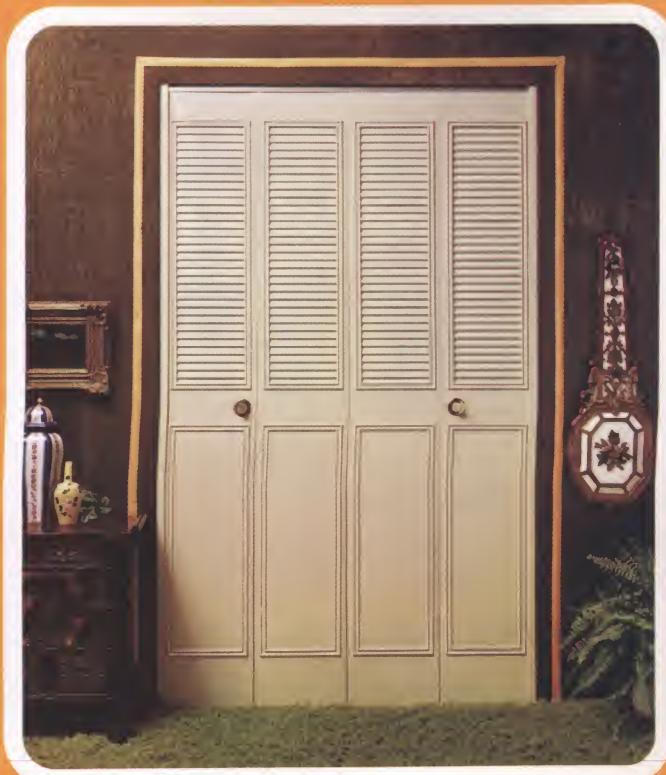


9. Jamb Trim (optional)

7 handsome door designs—authentic and distinctive



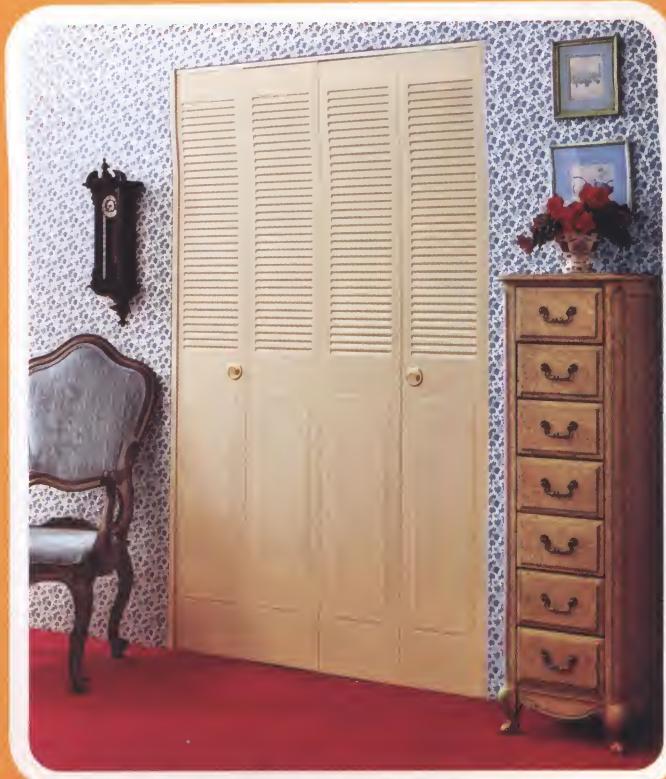
Full Mirror . . . full-height mirrors create richly reflective vista of silvery beauty, while adding visual spaciousness and imposing depth to room. Perfect way to double apparent room size with elegance and exceptional charm.



Savoy . . . traditional charm plus authentic handcrafted look with impressive relief accentuating depth of design. Air-flow louvers create patterned effect, while classic lower panels offer subtle contrast. Attractive moulding outlines door in picture frame setting.



Full Louver . . . large air-flow capability provides maximum ventilation. Ideally suited for furnace room, laundry area or wherever maximum air movement is required. Sturdy steel FLOAT-AWAY Doors assure fire resistance and rugged durability.



Colonial . . . light embossing creates unobtrusive panel design, while sturdy louvers allow free air-flow into closet. Ideal mating of beauty and function through attractive styling, durable construction, and superior design.



Concord . . . deeply-embossed doors resemble richly-carved wood, provide pleasing background for gracious living. Yet you save as much as 50% in installed costs over wooden doors—avoid callbacks due to warping, unsatisfactory operation.



Concord Door with optional attractive texturing in luxurious, leather-like finish. Enhances decor with extra touch of charm.



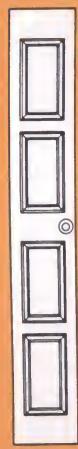
Georgetown . . . captures regal beauty of the past for contemporary enjoyment. Choice of standard or ceiling-high doors in this and other designs. Advantages of latter include increased usable shelf space and elimination of costly wall returns.



Flush . . . beautifully smooth surface continues uninterrupted expanse of wall line for effect of greater space. For custom decorating, cover surface with wallpaper, carpeting or original designs—newest styling mode for personalizing rooms!

float-away Bi-fold Closet Door Styles

Available with mirrors or as a full-mirror bi-fold door



Concord



Savoy



Mirror



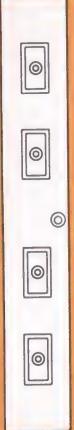
Louver



Colonial



Flush



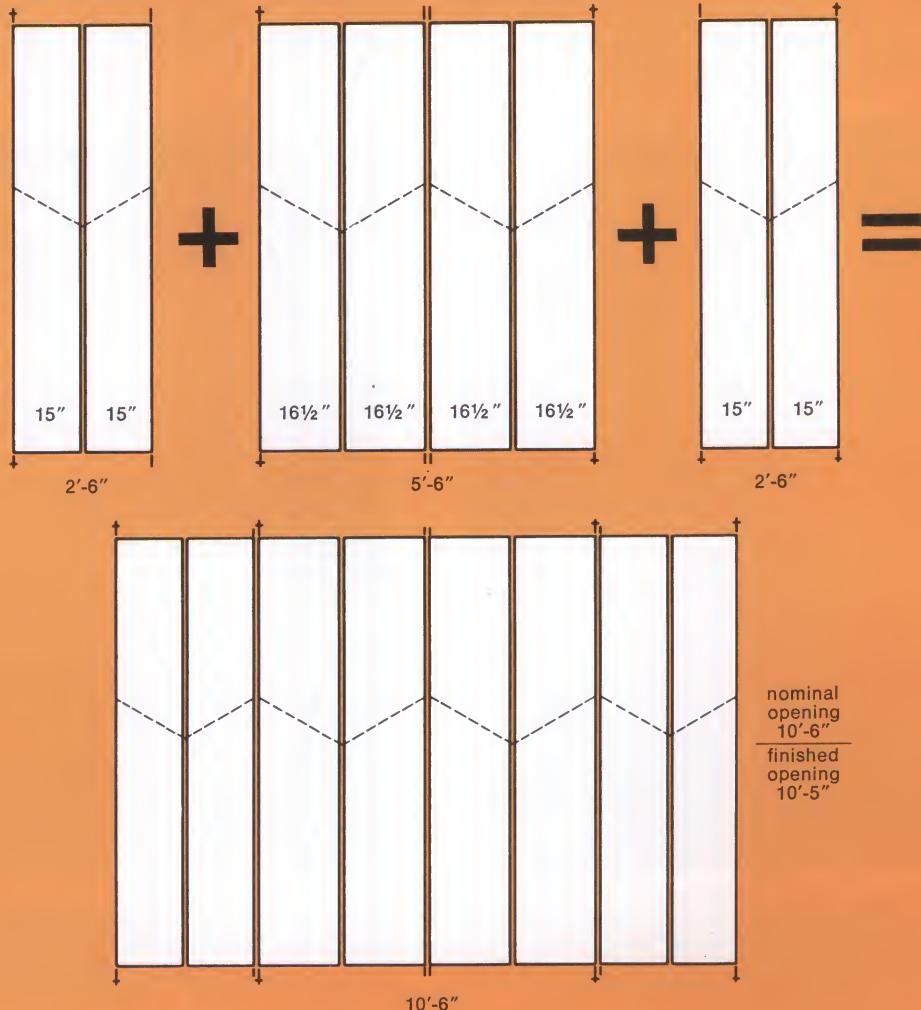
Georgetown

Door combinations for any opening

FLOAT-AWAY Doors fit virtually any opening width by using various combinations of 2-panel and 4-panel doors in multiple, in either identical or different sizes. Trim can compensate for slight construction inaccuracies and fractional width adjustments. Different designs can be intermixed in the same opening (especially Flush style with one of other designs), provided the arrangement is balanced in the

opening to present a symmetrical appearance.

Standard 2-panel doors are available in nominal widths from 1'6" to 3'0"; 4-panel from 3'0" to 6'0", all in 3" increments. Non-standard widths available on special order. Table (right) shows standard-size combinations for openings wider than 6'0". Normally 2-panel doors are recommended for 2'0" to 2'6" widths, 4-panel for 4'0" to 5'0".



Specify your closet system this easy way... Architectural Specifications

notes to architect

- In coastal areas where salt content in the air is high, specify 24-ga. electro-galvanized enameled steel which offers increased protection against corrosion.
- FLOAT-A-LEVEL top track is recommended for attachment to poured concrete ceilings.
- Jamb trim should be used to improve the opening appearance.
- To insure proper door operation, tracks should be masked before spray-painting or installed after painting is completed.
- Do not remove doors and shelves from original packing for installation until after completion of wall and floor finishes. This assures items will retain their excellent finish and beauty.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by FLOAT-AWAY Div. of Kinkead Industries and shall be installed in accordance with its current printed directions.

1.3 delivery and storage

All material shall be delivered in the original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather, the building shall be heated and ventilated during installation of bi-fold doors and closet shelves to maintain temperature and ventilation consistent with good working conditions for finish work.

Part 2: products

2.1 materials

a. FLOAT-AWAY bi-fold closet doors:

(1) Material and finish: 24-ga. bonderized (carbon steel) (electro-galvanized steel) having all surfaces uniformly coated with one coat electro-deposited baked-on enamel in bone-white color.

- Style: (Concord) (Savoy) (Flush) (Louver) (Colonial) (Georgetown) (Full Mirror)⁽¹⁾ (Concord/Mirror)⁽¹⁾⁽²⁾ (Savoy/Mirror)⁽¹⁾⁽²⁾ (Flush/Mirror)⁽¹⁾⁽²⁾ (Louver/Mirror)⁽¹⁾⁽²⁾ (Colonial/Mirror)⁽¹⁾⁽²⁾ (Georgetown/Mirror)⁽¹⁾⁽²⁾ with sound-deadening properties.

⁽¹⁾Available with full-length mirror only.

⁽²⁾Mirror placed on lead panels only.

- Size: 2-panel width (1'6") (1'9") (2'0")* (2'3") (2'6")* (2'9") (3'0")*; 4-panel width (3'0") (3'6") (4'0")* (4'6") (5'0")* (5'6") (6'0")*; height (6'8") (8'0").

(Concord, Mirror style doors available only in asterisked widths.)

- Pivots and guides: bottom, threaded with lock nut and 7/8" maximum adjustability; top, spring-loaded.

- Knobs: (brass-standard) (aluminum) (antique bronze).

- Full mirror handles: (satin aluminum—standard) (satin gold).

b. Guide track:

Extruded aluminum, mill finish; top, (FLOAT-A-MATIC) (FLOAT-A-LEVEL) type; bottom, FLOAT-A-MATIC type.

c. Jamb trim:

24-ga. bonderized enameled steel finished to match doors, width (1") (1 1/2") (2") (2 1/2") (3") (3 1/2"), height (6'8") (8'0").

d. Adjustable closet shelves

- Material and finish: 24-ga. bonderized enameled carbon steel having all surfaces uniformly coated with one coat electro-deposited baked-on enamel in bone-white color.

- Style: (clothing shelf with rod) (storage shelf) (linen shelf).

- Size: (clothing) (storage) shelves (12") (14") deep, (23 1/2"—36 1/2") (35 1/2"—48 1/2") (47 1/2"—60 1/2") (59 1/2"—72 1/2") (71 1/2"—84 1/2") (83 1/2"—96 1/2") adjustable width range; linen shelves 14" deep, (17 1/2"—30 1/2") (29 1/2"—42 1/2") adjustable width range.

- Off-Wall Bracket for (12") (14") deep shelves.

Part 3: execution

FLOAT-AWAY bi-fold doors, closet shelves and accessories shall be installed in accordance with current printed instructions of FLOAT-AWAY Division, Kinkead Industries.

float-away Closet Doors fit virtually any opening

STANDARD DOOR SIZES

DOOR SIZE	NO. OF PANELS	FINISH OPENING WIDTH	FINISH OPENING HEIGHT	DOOR SIZE	NO. OF PANELS	FINISH OPENING WIDTH	FINISH OPENING HEIGHT*
1'-6" x 6'-8"	2	18 1/2"	80 3/4"	1'-6" x 8'-0"	2	18 1/2"	95 1/4"
1'-9" x 6'-8"	2	21 1/2"	80 3/4"	1'-9" x 8'-0"	2	21 1/2"	95 1/4"
2'-0" x 6'-8"†	2	24 1/2"	80 3/4"	2'-0" x 8'-0"†	2	24 1/2"	95 1/4"
2'-3" x 6'-8"	2	27 1/2"	80 3/4"	2'-3" x 8'-0"	2	27 1/2"	95 1/4"
2'-6" x 6'-8"†	2	30 1/2"	80 3/4"	2'-6" x 8'-0"†	2	30 1/2"	95 1/4"
2'-9" x 6'-8"	2	33 1/2"	80 3/4"	2'-9" x 8'-0"	2	33 1/2"	95 1/4"
3'-0" x 6'-8"†	2	36 1/2"	80 3/4"	3'-0" x 8'-0"†	2	36 1/2"	95 1/4"
3'-0" x 6'-8"	4	36"	80 3/4"	3'-0" x 8'-0"	4	36"	95 1/4"
3'-6" x 6'-8"	4	42"	80 3/4"	3'-6" x 8'-0"	4	42"	95 1/4"
4'-0" x 6'-8"†	4	48"	80 3/4"	4'-0" x 8'-0"†	4	48"	95 1/4"
4'-6" x 6'-8"	4	54"	80 3/4"	4'-6" x 8'-0"	4	54"	95 1/4"
5'-0" x 6'-8"†	4	60"	80 3/4"	5'-0" x 8'-0"†	4	60"	95 1/4"
5'-6" x 6'-8"	4	66"	80 3/4"	5'-6" x 8'-0"	4	66"	95 1/4"
6'-0" x 6'-8"†	4	72"	80 3/4"	6'-0" x 8'-0"†	4	72"	95 1/4"

*For 7'-6" high doors, finish height is 89 1/4". †Concord and Mirror Doors available only in these sizes.

Adjustable Shelves... deluxe shelving for closet storage - at low cost!

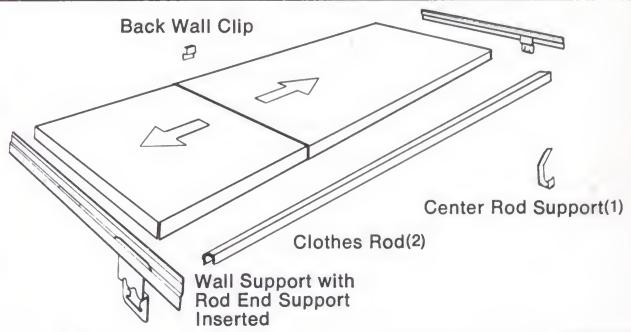
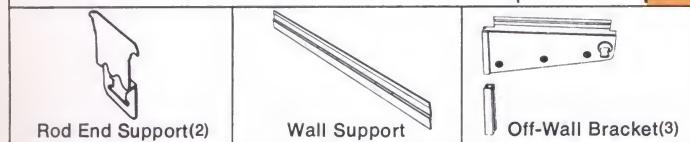
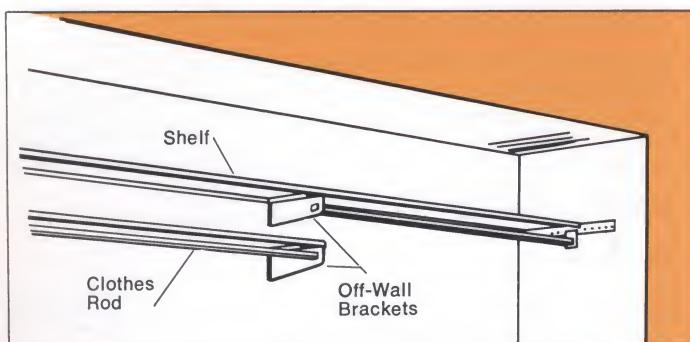
Perfect mate to FLOAT-AWAY Doors, these adjustable, all-steel shelves give you a completely integrated closet system. Sturdy prepainted shelves install in minutes with the smart look of decorator beauty. No cutting . . . no sawing . . . no fitting . . . no painting . . . no dangerous sharp edges—installation right now!

Plated bone white enamel finish matches FLOAT-AWAY Doors, has same lustrous, mar-resistant coating that won't chip or crack even if dented with a hammer. Adjustable shelves expand for precise fit . . . turn corners . . . mount in tiers . . . attain any continuous length desired . . . utilize full closet storage capacity.

Choice of six different shelf lengths, ranging from 24" to 96" (expanded), in selection of three types—clothing, storage and linen closet shelves. With Off-Wall Brackets, shelves connect together to any length required or allow positioning shelf between walls. Clothing and storage shelves available in 12" and 14" depths, 1½" thick. Linen shelves available in 14" depth, 5/8" thick. Heavily nickel-plated adjustable clothes rod adds luxury appearance, won't rust or tarnish, resists scratching by clothes hangers.



Easily-installed Adjustable Shelves and Rods quickly customize closet interiors for greater utility.



(1) Included with 60" to 72" and larger sizes. (2) Included with all clothing shelves. (3) Available separately. Sets are complete with all parts, fasteners.

Shelving sizes to fit all requirements

Clothing Shelves and Storage Shelves, in choice of 12" and 14" depths, are available with following minimum-maximum extension:

23½" - 36½"	59½" - 72½"
35½" - 48½"	71½" - 84½"
47½" - 60½"	83½" - 96½"

Linen Shelves, in 14" depth only, are available with the following minimum and maximum extension:

17½" - 30½"
29½" - 42½"

For further information, call or write:
KINKEAD INDUSTRIES INCORPORATED
1123 Zonolite Rd., N.E., Atlanta, Ga. 30306. Phone: (404) 875-8021
or 5860 N. Pulaski Rd., Chicago, Ill. 60646. Phone: (312) 463-7800.



**KINKEAD
INDUSTRIES**
INCORPORATED • CHICAGO 60646

Subsidiary of UNITED STATES GYPSUM COMPANY

SA
905

USG sound control ceilings

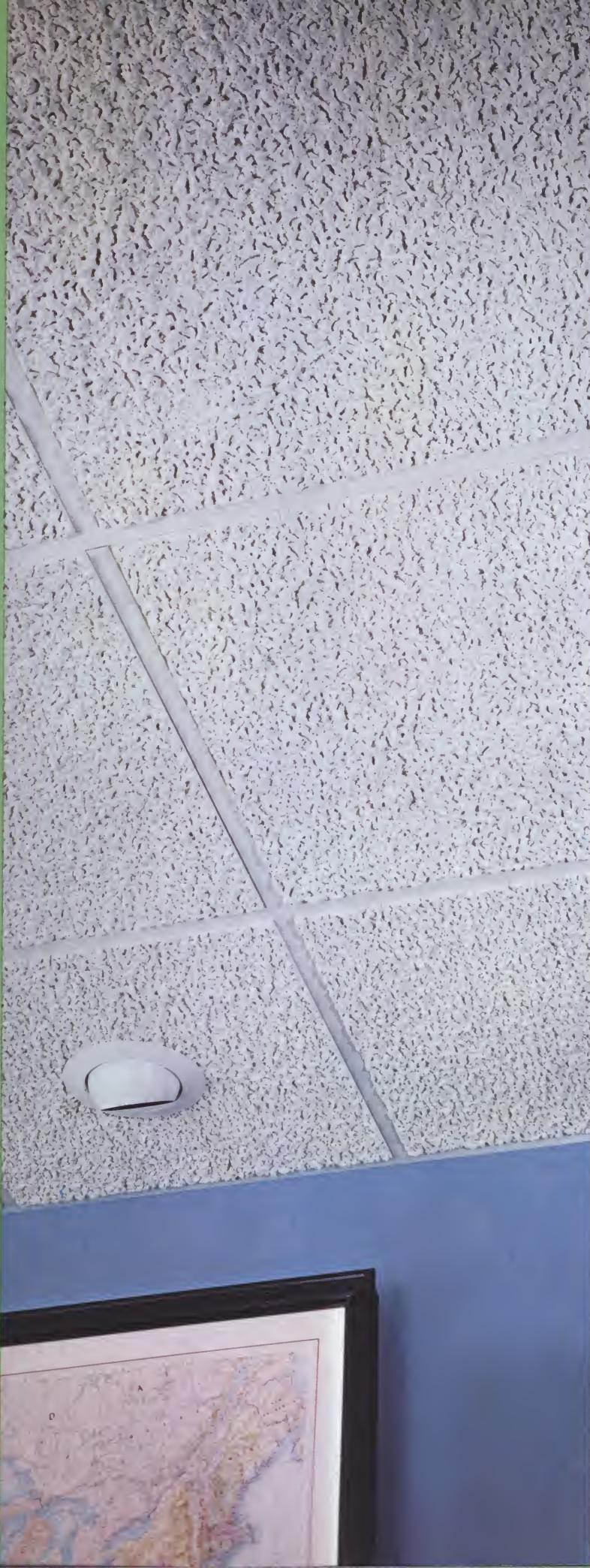
product folder



Front Cover: Strong daylighting in hotel lobby contrasts rough-fissured Glacier ACOUSTONE Tile Ceiling with smooth walls and tiled-pattern floors to delight guests with interplay of textures.

REGENCY HYATT HOUSE, Atlanta, Ga.
Architect: EDWARDS & PORTMAN, AIA

New Seacrest ACOUSTONE Mineral Panels in ▶ exposed grid provide a pleasantly rough, reticulated texture that belies the piping and electrical cable concealed above.



contents

Types and Sizes	4-5
ACOUSTONE Tile and Panels	6-9
MOTIF'D ACOUSTONE Tile	10-11
Shadow Line ACOUSTONE Panels	11
Fire-Rated and PC ACOUSTONE	12
USG Gypsum Ceiling Panels	13
ACOUSTONE Space Units	14-15
AURATONE Panels and Tile	16-21
HI-LITE Panels and Tile	22
ACOUSTISORBER Space Units	23
AIRSON Air Distribution Products	24-25
Suspension Systems, Accessories	26-27
Tables, Sound Characteristics	28-29
Wool-Backed Panel Systems	30
Architectural Specifications	30-31



Rough-textured Glacier ACOUSTONE Panels contrast with smooth, exposed grid in this integrated ceiling system.

description and utility

Whatever your ceiling requirements—sound absorption or attenuation, fire protection, accessibility, air distribution—these sound control products, the industry's finest, will fulfill the function.

The tremendous broadening of architectural needs in sound control has been anticipated by United States Gypsum. Through continual research and development, the U.S.G. product line offered today is the most complete ever—ceiling surfaces of classic design and functional beauty in a range of textures and patterns to suit virtually any room and any condition.

The wide scope of types and sizes is presented on the next two pages. Detailed descriptions of individual products follow the tables. Total-performance suspension systems are covered on pages 26 and 27, fire-rated designs on pages 12 and 18 through 20.

U.S.G. Sound Control Products are sold installed, on a contract basis by U.S.G.-recommended Acoustical Contractors. The contractor furnishes all materials and labor necessary to complete the job in accordance with the specifications in this folder.

Critical lighting conditions for acoustical ceilings are often created by modern architectural practice, particularly the use of high light fixtures, windows and cove lights. It is important to visualize the final room lighting when selecting a tile or suspension system. In some instances, beveled materials or exposed suspension produce the most satisfactory results. Complementary components designed as part of an integrated system give assurance of fine appearance and reliable performance. Your U.S.G. representative is happy to assist in your sound control designs.

types and sizes

ACOUSTONE Tile and Panels, prestige sound control materials, are molded mineral fiber units in sizes from 12"x12" to 24"x48" as shown below (as well as practical sizes that can be cut from 24"x48" or 24"x72" molds on special order). ACOUSTONE is provided in nine standard patterns, with special types for fire, sound and special conditions. The thermal resistance (R) is 2.12 (Installed Resistance of ACOUSTONE db is 4.20 upward and 11.08 downward).

product	pattern	nom. thickness	module size (in.)	edge	installation			weight psf
				SE	BE	adhes.	conc.	exp. grid
Tile								
ACOUSTONE	"F" Fissured Glacier	3/4"	12x12 to 12x48	x	x	x	x	
		3/4"	12x12 12x24	x		x	x	
	Finesse	3/4"	12x12 12x24		x	x	x	
		3/4"	12x12	x		x	x	
ACOUSTONE db	Fissured	3/4"	12x12 to 12x48	x	x		x	
		3/4"	24x24	x	x		x	
		3/4"	12x24		x		x	
	Glacier	3/4"	12x12	x			x	
		3/4"	12x24	x			x	
	Finesse	3/4"	12x12 12x24		x		x	
ACOUSTONE 90	Fissured, Glacier, Finesse		12x12	x	x(1)		x	
	Fissured, Glacier, Finesse		12x12	x	x(1)		x	
ACOUSTONE 120	Fissured, Finesse	3/4"	12x12	x	x(1)		x	
ACOUSTONE 180	Fissured, Finesse	3/4"	12x12	x	x		x	
AIRSON ACOUSTONE (A-2, A-5, and unslotted)	Fissured	3/4"	12x12 to 24x24	x	x		x	
	120 Fissured	3/4"	12x12	x	x		x	
	Glacier	3/4"	12x12, 12x24	x			x	
	120 Glacier	3/4"	12x12	x			x	
MOTIF'D ACOUSTONE	Georgian, Striated, Galaxy, Fantasia	3/4"	12x12	x			x	
Panels								
ACOUSTONE db (2)	Fissured, Glacier, Finesse, Seacrest	3/4"	24x24, 24x36, 24x48	Sq.	SL			x
ACOUSTONE 120 (2)	Fissured, Glacier, Finesse, Seacrest	3/4"	24x24	x	x			x
								1.30-1.40

ACOUSTONE Space Units are molded mineral fiber sound absorbers for surface-mounting on ceilings and walls where exceptional absorption and special treatment are required. Space Units are provided in two patterns; three installation methods may be used.

product	pattern	nom. thickness	module size (in.)	edge	installation		weight psf
ACOUSTONE Space Units	Glacier, Finesse	2 1/4"	10 1/2 x 10 1/2	beveled		clip, or adhesive	3.00 lbs./Unit

USG Gypsum Ceiling Panels offer fire-rated construction, without sound absorption, by means of economical lay-in application. They are offered in 1/2" and 5/8" thickness, 24"x24" and 24"x48" sizes. Thermal resistance (R) is 0.45 for 1/2" thickness and 0.56 for 5/8" thickness.

USG Gypsum Ceiling Panels Interior Exterior	Snowdrift Snowdrift	1/2" 1/2"	24x24, 24x48 24x24, 24x48	Sq. Sq.	exp. grid exp. grid		1.88 1.88
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USG Asbestos Board is produced in 24"x24" and 24"x48" sizes for lay-in installation in exposed grid suspensions. While sound absorption of panels alone is negligible, they are effective when perforated and backed by sound-absorbing material.

USG Asbestos Board	Perf., Unperforated	3/16"	24x24, 24x48	Sq.	exp. grid, or nail	1.50-1.75
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AURATONE Tile and Panels are water-felted mineral fiber acoustical products marketed in eight patterns and sizes of 12"x12" to 30"x60". Thermal resistance (R) is 1.47(1/2"), 1.85(5/8") and 2.18(3/4") for regular AURATONE materials and 1.85(5/8") and 2.14(3/4") for AURATONE FIRECODE products.

product	pattern	nom. thickness	module size (in.)	edge		installation			weight psf
				BB	BE	adhes.	conc.	exp. grid	
Title									
AURATONE	Pin-Perf.	1/2"	12x12 12x24	x		x x	x		.80 .80
		5/8"	12x12 12x24 24x24		x x x	x	x x		.90 .90 .90
AURATONE FIRECODE	Pin-Perf., Random, Fissured, Filigree, Nordic	5/8" 3/4"	12x12 24x24 12x12, 12x24		x(6) x x(6)		x x x		1.15 1.15 1.40
AIRSON AURATONE FIRECODE (A-2, A-5, and unslotted)	Fissured	5/8" 3/4"	24x24 12x12, 12x24		x x(6)		x x		1.15 1.40
Panels									
AURATONE	Pin-Perf., Fissured Random, Filigree, Nordic	5/8" 3/4"	24x24, 24x36 24x48, 24x60 (3)	x				x x x	1.15 1.37 1.15
AURATONE FIRECODE	Pin-Perf., Fissured, Filigree, Nordic	5/8" 3/4"	24x24, 24x48, 30x60	x				x	1.37
AIRSON AURATONE A-2, A-5, and unslotted)	Fissured, Filigree	5/8"	24x24, 24x36, 24x48, 24x60	x				x	1.15
AIRSON AURATONE FIRECODE (A-2, A-5, and unslotted)	Fissured, Filigree	5/8" 3/4"	24x24, 24x48, 30x60	x				x	1.37
AURATONE FIRECODE HF	Pin-Perf., Nordic	3/4"	24x24, 24x48	x				x	1.40

HI-LITE Tile and Panels are low-cost water-felted mineral fiber acoustical products manufactured in one size, thickness and pattern of each. Thermal resistance (R) is 2.27.

product	pattern	nom. thickness	module size (in.)	edge		installation			weight psf
				BE	SL	adhes.	conc.	exp. grid	
HI-LITE Tile HI-LITE Panels	Filigree	5/8" 5/8"	12x12 24x24	x	x	x x	x	x	1.00 1.00

PERFATONE Acoustical Units are perforated metal pans containing mineral fiber pads for sound absorption. They are produced in sizes of 12"x12" to 12"x48" in four perforation patterns. They are designed for snap-in installation in indirect-hung T-bar suspension. Thermal resistance (R) of the pad only is 4.75.

PERFATONE Acoustical Units (steel, stainless steel or aluminum)	Diagonal Perf., Unperforated	1 1/16"	12x12, 12x24, 12x36, 12x48 (5)	beveled		conc. (4)		.52-1.14
Fire-Rated PERFATONE Acoustical Units (steel only)	Diagonal Perf., Random Perf.	2 13/16"	12x24	beveled		conc. (4)		1.10

ACOUSTISORBER Space Units provide supplemental reflected-sound absorption for noisy industrial plants. They are low-cost, 20"x24" mineral fiber pads, plastic encased, for suspension overhead, spacing dependent on sound reduction desired.

NOTES: (1) Glacier pattern not available with beveled edge. (2) Also available in AIRSON A-2, A-5 and unslotted. (3) Other sizes available on special order. (4) Designed for snap-in attachment to T-Bars. (5) Scored to represent 12" x 12" tile. (6) Beveled edge, tongue and groove.

Abbreviations: adhes.—adhesive; SE—square edge, standard kerf; BE—beveled edge, standard kerf; Sq.—trimmed square edge, no kerf; SL—edge rabbeted for shadow line; BB—butt beveled edge, no kerf; conc.—concealed suspension; exp. grid—exposed grid suspension, direct hung; psf—pounds per square foot; perf.—perforated.



Inviting open atmosphere is created with simplicity of decoration and Finesse pattern ACOUSTONE Tile in concealed suspension.

FIRST NATIONAL BANK, Chicago, Ill.

Architects: C. F. MURPHY Assoc. and The PERKINS & WILL Partnership

ACOUSTONE "F" Ceiling Tile visually softens the hard natural surfaces while absorbing sound reverberating from them. ACOUSTONE "F" also serves as background for decorative emphasis of lighting fixtures.

THE JULLIARD SCHOOL, New York, N.Y.

Architect: PIETRO BELLUSCHI

Associate Architects: EDUARDO CATALANO, HELGE WESTERMANN

ACOUSTONE Mineral Acoustical Tile and Panels... prestige products for creative ceiling designs

ACOUSTONE, with its eloquent patterns and textures, sets the industry standard for beauty and efficient sound attenuation and absorption. Now, more than ever before, its range of sizes, edge treatments and suspension methods offer complete flexibility of concept to the designer.

Designed to absorb sound originating within a room, ACOUSTONE is manufactured by binding mineral fibers into a lightweight, highly decorative product. The molding process insures that no two tile surfaces are monotonously alike. Yet in total, they blend to form ceilings of unique beauty.

ACOUSTONE Mineral Acoustical Tile and Panels are manufactured under rigid tolerances to produce closely controlled dimensions. All types have been tested in accordance with AMA 1-II attenuation and ASTM C423 absorption procedures—data reported on pages 28 and 29.

Fire and Sound Ratings—Noncombustible; Federal Spec. SS-S-118a, Type III, Class 25; Fire Hazard Classifications (ASTM E84 test procedure): flame spread 15, fuel contributed 15, smoke developed 0 to 15; also flame spread 25, fuel contributed 30,

smoke developed 0. See page 12 for assemblies with fire ratings up to 3 hrs., page 29 for tested sound attenuation up to STC Range 55-60.

Thermal Resistance (R)—2.12 (for tile only)

installed resistance:	heat flow up	heat flow down
adhesive mounting	2.72	3.02
metal suspension (unbacked)	4.18	4.88
(foil-backed)	4.20	11.08

Maintenance—The smooth white-painted finish resists soiling and limits objectionable air travel (breathing) through face of tile. Standard finish is washable vinyl coating, factory applied and heat cured. Also see ACOUSTONE PC, page 12.

Tile and panels may be washed with damp sponge or cleaned with a vacuum cleaner, or chemical rubber sponge (used dry). To paint, roll or spray with a non-bridging paint (TAL Latex Wall Paint or equal).

SA

905

USG sound control ceilings





FISSURED



GLACIER



FINESSE



SEACREST



DOMINO

limitations

Installation of ACOUSTONE Tile or Panels should not begin until residual moisture from plaster, concrete or terrazzo work is dissipated. ACOUSTONE is designed for installation and use under standard occupancy conditions at no more than 80% RH.

ACOUSTONE Tile or Panels should not be used: (a) where continuously exposed to high humidity; (b) below wainscot height or where exposed to impact, abrasion or tampering.

"F" Fissured . . . a bold—yet orderly—statement of classic beauty

Tile and panels are molded, screeded and planed to achieve a broad range of textures, from modest veining to bold fissures, resembling the natural beauty of travertine marble. These wide variations of fissure assure that no two tile faces will be exactly alike. When installed in a random application of fissure direction and intensity, ACOUSTONE "F" produces a ceiling that is truly non-directional.

Glacier . . . rugged texture denoting stability

The heavily fissured, rough surface of Glacier ACOUSTONE Tile and Panels complements contemporary architecture's emphasis on natural texture. The screeded, unplanned finish provides a treatment not generally available in acoustical tile products. Edge joints (and air distribution orifices), while not hidden, are generally obscured by the rich, deeply etched texture.

Finesse . . . light, subtle fissure for delicate, formal settings

Sophisticated environments suggest the finesse of Finesse ACOUSTONE Tile or Panels (page 6). The fissures are the same natural, non-repeating pattern as "F" Fissured, but much smaller and more subtle. The surface is finely planed to tailor the unit; the beveled edges hide minor suspension irregularities.

Seacrest . . . fluid roughness reminiscent of boiling, running surf

The reticulated, nearly non-directional pattern of Seacrest ACOUSTONE Panels brings unique excitement to dull, uninteresting areas. Square-cut or Shadow Line edge configurations are available for lay-in application.

Domino . . . striking frankness in small scale

Routed to simulate nine mini-tile in each 12"x12" unit, Domino ACOUSTONE Tile boldly draws attention to the ceiling with its striking pattern. Ideally suited to rooms of smaller scale, Domino is refreshingly honest about being tile. Fissures are of the same scale and type as those of "F" Fissured.

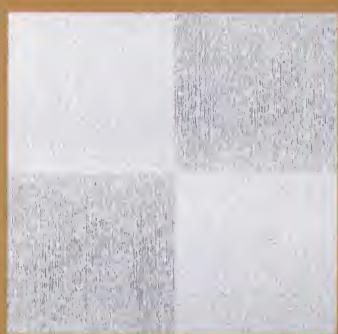
ACOUSTONE "F" Tile lends pleasing contrast in texture to brightly sunlit view through window-wall.

NAZARETH COLLEGE OF ROCHESTER, Rochester, N.Y.
Architect: GIFFELS & ROSSETTI, Detroit, Mich.



MOTIF'D ACOUSTONE patterns

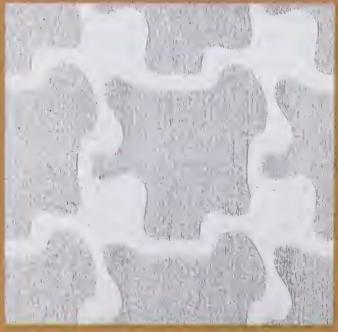
GEORGIAN



STRIATED



GALAXY



FANTASIA

**MOTIF'D ACOUSTONE Mineral Acoustical Tile . . .
ultimate in distinctive appearance**

These impressive patterns are produced by altering ACOUSTONE Tile by a process that permanently etches a bas relief design into the surface. The patterns are accented by the varying shadows caused by directional influence of the lighting, rather than by applied color. Four 12"x12" tiles complete the basic pattern, except in Galaxy. Now offered in four striking patterns, MOTIF'D ACOUSTONE provides NRC ranges up to .75-.85 and Class a light reflectance. All patterns are also available in ACOUSTONE db and Fire-Rated ACOUSTONE.

limitation

When installing Striated pattern, a checkerboard arrangement of tile (illustrated at left) is recommended to avoid noticeable misalignment of the striations.

**Custom MOTIF'D ACOUSTONE Tile . . .
designed by you for personalized effect**

Almost any custom pattern desired—company logograms, function designs, institutional symbols—can be produced with the same methods as in MOTIF'D ACOUSTONE. Designs may be repeated over the entire ceiling or intermixed with standard patterns of ACOUSTONE Tile to achieve the desired results. U.S.G. Sales Engineers can advise the additional cost and complete ordering details for Custom MOTIF'D ACOUSTONE.

Galaxy pattern of MOTIF'D ACOUSTONE dramatizes this plain church interior with rich, contrasting appearance.

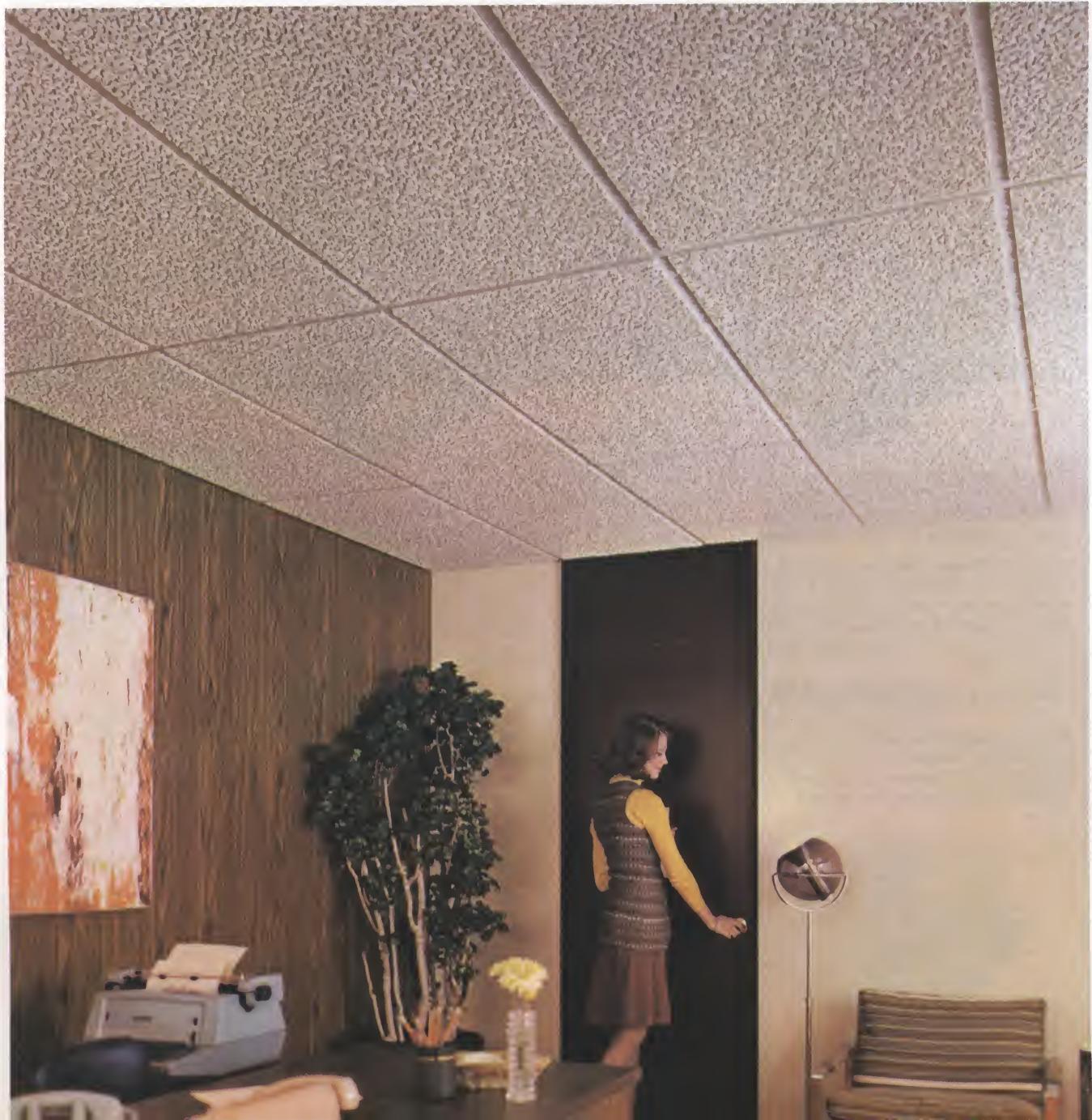
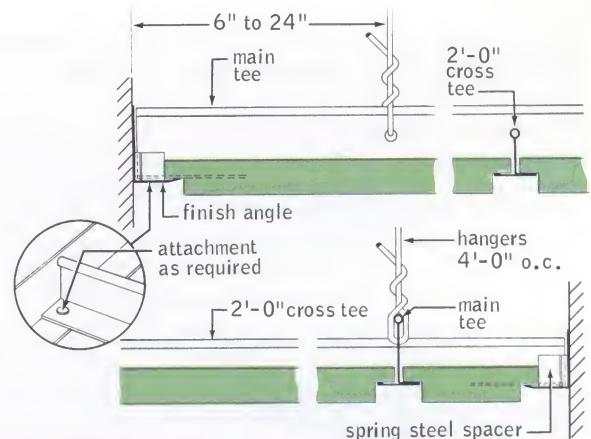
ST. ANN'S CHURCH, Avon, Conn.



**Shadow Line ACOUSTONE Panels . . .
functional design that speaks for itself**

Deep-rabbeted edges of these 24"x24" or 24"x48" panels combine with direct-hung exposed grid suspension system (see drawing, right) to produce one of the most impressive acoustical ceiling treatments available today. The massive-sized panels give any room a bold new scale, accenting the masculine, proclaiming the integrity of design and construction. Available in **Fissured**, **Glacier**, **Finesse** and **Seacrest** patterns of ACOUSTONE Mineral Acoustical Panels.

Pattern and texture of 24"x48" Seacrest ACOUSTONE Panels with Shadow Line edge are immediately apparent in this office, but their primary function is keeping things quiet.



Special-Function ACOUSTONE Tile and Panels... with desired fire, sound, surface features

Fire-Rated ACOUSTONE, in Fissured, Glacier or MOTIF'D patterns, provides 1, 1½, 2 and 3-hr. (Fissured or MOTIF'D only) fire protection while offering the same high sound absorption, light reflection and fissured beauty of regular ACOUSTONE Tile. UL label service is provided for these designs. Refer to pages 26 and 27 for suspension system information, and to U.S.G. Fire-Rated Systems brochure SC-505 for full data on these systems.

ACOUSTONE db presents the same appearance as regular ACOUSTONE patterns. It has a special backing added for application where higher sound attenuation and improved resistance to breathing are desired. It not only absorbs noise but efficiently retards sound travel through ceiling and over partitions (STC 40 to STC 44)—also eliminates the cost of separate backing. A special reflective foil back surface provides added resistance against

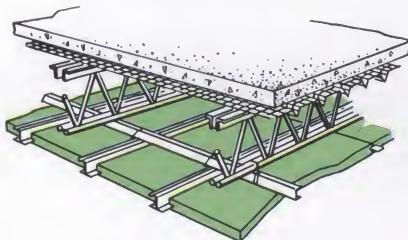
winter heat loss—equal to a full inch of gypsum, and even greater resistance to summer heat gain—equal to over an inch of wood fiber roof insulation. The advantage is quickly translated into dollars saved in heating and cooling costs, as indicated by the "R" factors shown on page 6. Available with **Fissured** surface of ACOUSTONE "F", and in **Glacier**, **Finesse** and **Seacrest** textures.

ACOUSTONE PC is supplied with a factory-applied plastic surface coating, ideal for reducing maintenance in ceilings where high soiling is anticipated. The durable soft-luster surface has at least 10 times the washability of regular acoustical finishes; otherwise, tile characteristics remain unchanged. All ACOUSTONE products listed above are available with this plastic coating.

Standard Color of all ACOUSTONE products is painted white. Pastel colors of TAL LATEX Paint are available on special order.

bar joist/concrete deck on riblath

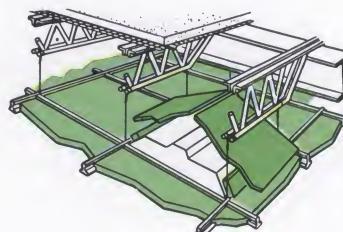
3-Hr. UL Design G017 (was 96-3 Hr.)
ACOUSTONE 180 Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.



2-Hr. UL Design G018 (was 41-2 Hr.)
ACOUSTONE 120 Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.

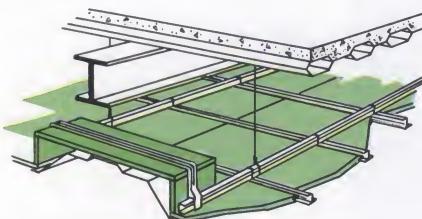
1½-Hr. UL Design G020 (was 6-1½ Hr.)
ACOUSTONE 90 Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.

2-Hr. UL Design G228 (Beam 2 Hr.)
(was 278-2 Hr.)
ACOUSTONE 120 Mineral Tile, 24" x 24", laid on direct-hung Shadow Line grid suspension with concrete deck above.†



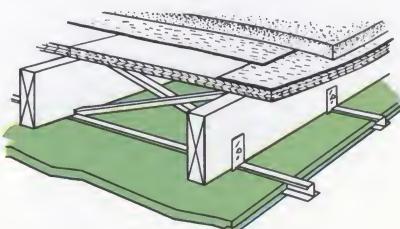
steel frame, floor/concrete deck

2-Hr. UL Design A010 (was 85-2 Hr.)
ACOUSTONE 120 Mineral Tile, 12" x 12", suspended on indirect-hung concealed Z-splines with concrete deck above.†



wood joists & subfloor

1-Hr. UL Design L003 (was 15-1 Hr.)
ACOUSTONE 90 Tile, 12" x 12", on concealed Z-splines attached to wood joists with wood floor or MASTICAL Underlayment Compound.



†AIRSON ACOUSTONE 120 Tile may be substituted.



USG Gypsum Ceiling Panels... low-cost ceilings with 2-hr. fire rating

USG Gypsum Ceiling Panels are composed of noncombustible gypsum core with baked-on textured paint finish. They are produced in two formulations—exterior and interior—to provide attractive ceilings and soffits at economical cost while exhibiting superior fire resistance, high light reflectance and ease of maintenance. Available $\frac{1}{2}$ " thick, they accommodate 24"x24" or 24"x 48" exposed grid suspension systems. Edges are square-cut for lay-in application. Light reflectance is Class a (ASTM C523 test procedure).

Fire Resistance—USG Gypsum Ceiling Panels are noncombustible. Fire hazard classification (ASTM E84 test procedure): flame spread 15, fuel contributed 15, smoke developed 0. FIRECODE panels qualify for 2-Hr. UL Design G222 (Beam 2 Hr.).

Sound Rating—When tested in exposed grid suspension system, continuous over partitions, USG Gypsum Ceiling Panels produced sound attenuation in the STC 40-44 range.

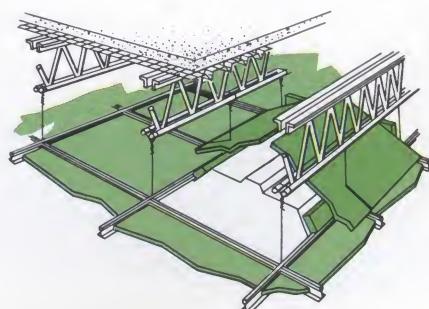
Economy, Accessibility—USG Gypsum Ceiling Panels provide total accessibility to service areas above at minimum cost for fire-rated construction.

Limitation—not recommended where (a) sound absorption is required; (b) exposure to moisture is extreme or continuous; (c) directly exposed to weather or water. Exterior suspension system must be approved for exterior use by manufacturer.

USG Gypsum Ceiling Panels provide ideal exterior ceiling for drive-in bank canopy.

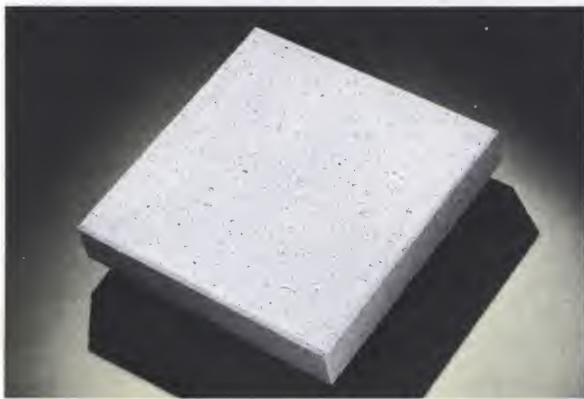
The NATIONAL BANK OF SOUTH CAROLINA, Columbia, S.C.
Architect: LA FAYE-LA FAYE & Assoc.

2-Hr. UL Design G222 (Beam 2 Hr.)
(was 312-2 Hr.)
USG FIRECODE Gypsum Ceiling Panels,
1/2" x24"x24" laid on direct-hung exposed
grid suspended from bar joists with 2½"
concrete deck above.





GLACIER . . . Bold, rich texturing created by deep, heavy fissures on the natural, unplanned surface



FINESSE . . . Classically beautiful and subdued . . . created by subtle fissures within the finely textured natural surface

ACOUSTONE Space Unit patterns

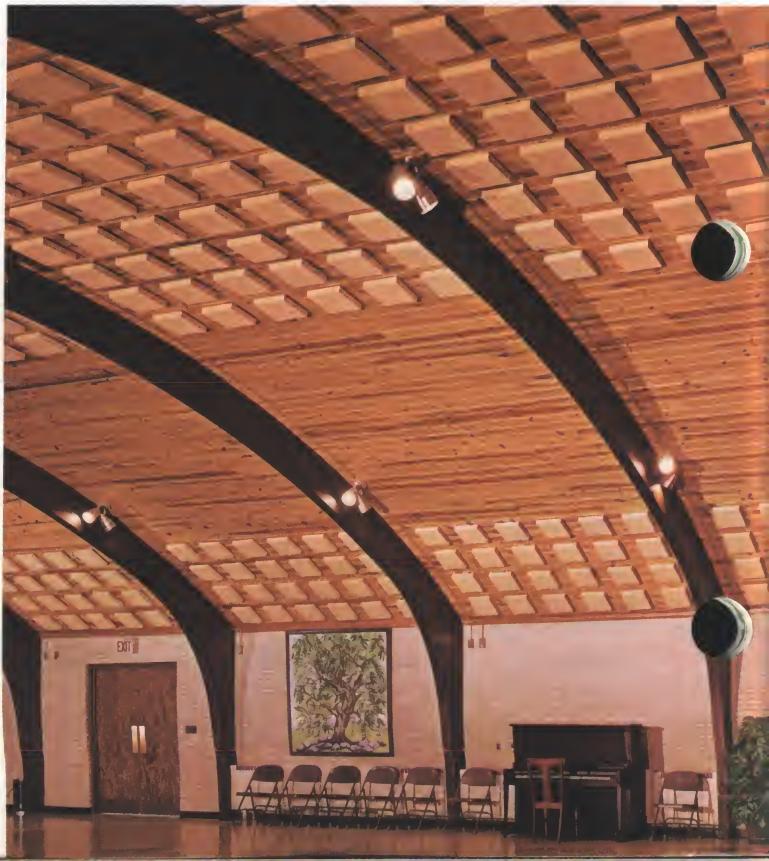
ACOUSTONE Space Units . . . simplified modern method of adding absorption

Uncontrolled reverberations transform sound into noise, muffling music and disrupting effective communication. ACOUSTONE Space Units control reverberation for optimum acoustics in a wide variety of room functions. These efficient Space Units *absorb sound on all six surfaces* to reduce reverberation, the amount depending upon number and spacing of Units and sound source frequency. They also are effective in eliminating flutter echo, reducing noise levels and treating "spot" problem areas in both new construction and remodeling.

ACOUSTONE Space Units are free-standing, sound-absorbing design plaques composed of mineral fibers and binder, molded to form noncombustible, lightweight units. They can be used in many possible arrangements on either walls or ceilings as primary acoustical treatment, or as an economical supplement to other acoustical control.

Produced in two patterns—**Finesse**, with a finely textured smooth surface, and **Glacier**, featuring a heavily fissured rough surface—10½" sq. x 2¼" thick, designed for surface-mounting with one of two types of metal clip hardware. Standard color is white. Standard finish is washable vinyl coating, factory-applied and heat-cured.

ACOUSTONE Space Units easily solve stubborn reverberation problems, photos illustrate only two of numerous applications.



Sound Absorption (ASTM C423 test procedure)

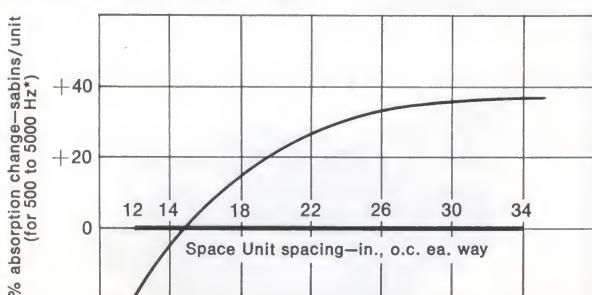
sabins/unit (1)

product	band center frequency—Hz					
	125	250	500	1000	2000	4000
ACOUSTONE Space Units at 15" o.c. ea. way (2)	0.3	0.8	1.4	1.7	1.4	1.3

(1) One sabin is the absorption equivalent of one square foot of material having an absorption coefficient of 1.00.

(2) Spaced in a regular pattern over a fairly large area of treated wall or ceiling. Other spacings may be used, but Space Unit absorption must be adjusted according to chart below.

Space Unit Absorption-Adjustment (for other than 15" o.c. spacing)



*125 and 250 Hz bands not shown, since their absorption change at spacings greater than 15" o.c. is negligible and at closer spacing cannot be extrapolated.

limitations

ACOUSTONE Space Units are not recommended where subjected to impact, water immersion, splashing or condensation. They may be used under certain conditions of adverse temperature and humidity (contact your U.S.G. sales representative for acceptability). Ceiling or overhead installation is not recommended where condensation is likely, such as in swimming pools and ice rinks:

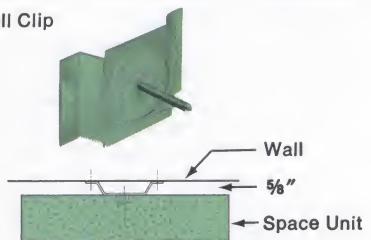
installation

Spin-on Clip—This standard wall clip is suitable for Space Units centered not closer than 14", or 7" from any obstruction, to allow free rotation of the unit during installation. The wall clip with a stud attached is secured with two suitable fasteners. Each Space Unit has a nut embedded in the back and is turned clockwise on the stud until secure.

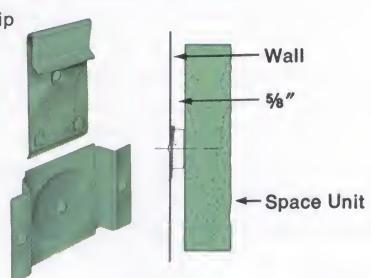
Snap-on Clip—This clip is used if Space Units are centered closer than 14", or less than 7" from obstructions; also used with concrete waffle slabs, intersecting walls or ceilings, columns and pilasters, or other close-quarter installations.

The wall clip is secured with two suitable fasteners and the supplementary Snap-on Clip is screw-attached to the Space Unit. The two clips are pressed together, first engaging Snap-on Clip's upper lip and then the lower.

Spin-on Wall Clip



Snap-on Clip



AURATONE

Noncombustible Panels and Tile ...

economical beauty in virtually every module

AURATONE Acoustical Panels and Tile are the result of a carefully controlled formulation that yields optimum balance between sound attenuation and sound absorption. They are made from prepared mineral fiber in a plant specially designed for this product. They include a high-density $\frac{3}{4}$ " ceiling panel, with improved stability, absorption, attenuation and insulation values.

The AURATONE line includes both Regular and FIRECODE Panels and Tile (see table, page 4), in the patterns illustrated here; the tile in $\frac{1}{2}$ ", $\frac{5}{8}$ " and $\frac{3}{4}$ " thicknesses, 12"x12", 12"x24" and 24"x24" sizes; the lay-in panels in $\frac{5}{8}$ " and $\frac{3}{4}$ " thicknesses, 20"x60" and 24"x24" to 30"x60" sizes. The 24"x24" tile is available with the exclusive **Shadow Line** edge for recessed grid appearance. All patterns come with a washable, smooth white finish.

Also available are AURATONE FIRECODE HF Panels, designed for applications where high temperatures and humidity are likely to be encountered. They are provided in $\frac{3}{4}$ " thickness, all standard panel sizes, and in Pin-Perforated and Nordic patterns.

Fire Resistance—Noncombustible; Federal Spec. SS-S-118a, Type III, Class 25; Fire Hazard Classification (ASTM E84 test procedure): flame spread 25, fuel contributed 25, smoke developed 5.

Fire ratings of 1 through 4 hours have been obtained for systems illustrated on pages 18 through 20.

Thermal Resistance (R)—Panels: 1.85 ($\frac{5}{8}$ "); 2.18 ($\frac{3}{4}$ ")

Tile: 1.85 ($\frac{5}{8}$ "); 2.14 ($\frac{3}{4}$ ")

Installed resistance:	heat flow up	heat flow down
$\frac{5}{8}$ " regular panels	3.90	4.60
$\frac{5}{8}$ " FIRECODE panels	3.05	4.60
$\frac{3}{4}$ " regular panels	4.18	4.88
$\frac{5}{8}$ " FIRECODE tile	3.50	4.20
$\frac{3}{4}$ " FIRECODE tile	3.80	4.50

Sound Ratings—The various AURATONE patterns range from .45 to .80 in NRC Average, and carry STC Ratings of 35 to 49 (see tables, pages 28 and 29). The ability to stop sound from passing through the ceiling material and back again into other occupied areas is one of the outstanding characteristics of AURATONE Panels. Major factors contributing to the high sound attenuation figures of AURATONE are the density and thickness of the panels.

Economy, Accessibility—AURATONE Panels are the wise choice for any application calling for maximum performance at minimum cost—plus easy access to service lines above the ceiling, through lay-in installation in exposed grids. AURATONE Tile edge designs accommodate spline suspension, recessed grid, stapling or adhesive attachment.

Light Reflectance—Class a.

Plastic Coating—All panel and tile patterns are available with the PC factory-applied plastic surface coating for vastly improved washability and reduced maintenance.

Limitations

Although AURATONE FIRECODE HF Panels are exceptionally durable under severe temperature and humidity conditions, they must be handled and stored with a reasonable degree of protection, and used in applications where they are not saturated or heavily splashed with water, or subjected to continual condensation.

AURATONE patterns



Pin-Perforated—Bone white, unobtrusive random pattern with medium and small holes (1530 per sq. ft.) adds illusion of height.



Random—Non-directional freeform perforation patterns with large and medium diameter holes, 445 per sq. ft.



Fissured—Random fissuring deeply etched below the planed surface, brings rugged beauty to any room.



Filigree—A truly non-directional fissure, the pattern so desired for large installations in more formal settings.



Nordic—Acoustical efficiency by means of minute perforations, combined with eye-pleasing new rifled texture.

Interesting combination: 12"x12" AURATONE Tile on concealed suspension surrounds higher ceiling of 24"x48" AURATONE Panels on exposed grid. ►

FRANK LLOYD WRIGHT JUNIOR HIGH SCHOOL, West Allis, Wisc.
Architect: SCHUTTE MOCHON, Inc.

**SA
905**

USG sound control ceilings



Special-Function AURATONE Panels and Tile ...

AURATONE FIRECODE Panels and Tile are specially formulated to provide 1- to 4-hour fire protection when used in suspension systems tested by Underwriters Laboratories Inc.: yet, they offer the same sound absorption, light reflectance and beauty as regular AURATONE Panels and Tile.

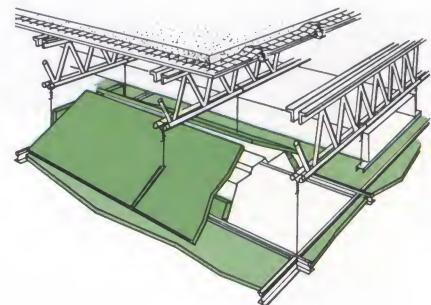
The following UL Designs offer a selection of exposed grid for lay-in applications, concealed Z-spline indirect-hung suspension and concealed accessible direct- or indirect-hung suspension. The concealed accessible suspension provides easy access to the plenum area above the ceiling for servicing electrical, heating and air conditioning installations. The Designs cover a wide range of floor and roof constructions to meet virtually every building requirement. Refer to pages 26 and 27 for suspension system information, and to U.S.G. Fire-Rated Systems brochure SC-505 for complete descriptions of these systems.

bar joist/poured gypsum deck

2-Hr. UL Design P207

(was RC-6-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from bar joists with 2" gypsum roof deck poured on gypsum or mineral fiber formboard.[†]



PANELS

bar joist/concrete deck on riblath

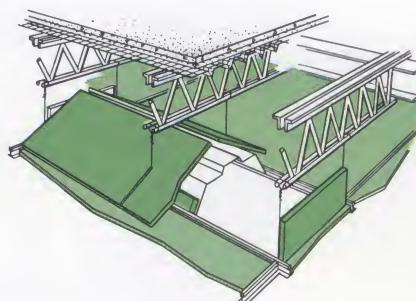
2-Hr. UL Design G231 (Beam 3 Hr.)

(was 299-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ " or $\frac{3}{4}$ ", modules from 24"x24" to 30"x60", or 20"x60", laid on direct-hung exposed grid suspended from bar joists with 2 $\frac{1}{2}$ " concrete deck on metal lath above.[†]

2-Hr. UL Designs G211 (was 72-2 Hr.) and G227 (Beam 4 Hr.) (was 226-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from bar joists with 2 $\frac{1}{2}$ " concrete deck above. Shadow Line Panels approved for Design G227.[†]



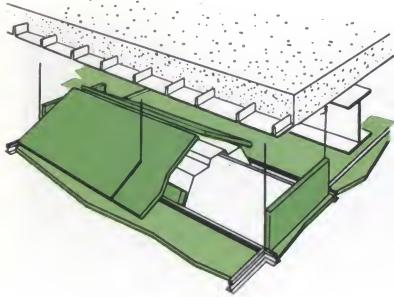
2-Hr. UL Design G251

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung grid suspended from bar joists, with 2 $\frac{1}{2}$ " concrete deck above poured over metal lath.

[†]AIRSON AURATONE FIRECODE Panels may be substituted.

steel frame, floor/concrete deck**4-Hr. UL Design D206 (Beam 4 Hr.)**

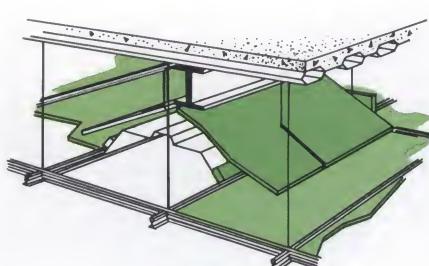
(was 45-4 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from steel floor and 2 $\frac{1}{2}$ " concrete deck above.**3-Hr. UL Design D207 (Beam 3 Hr.)**

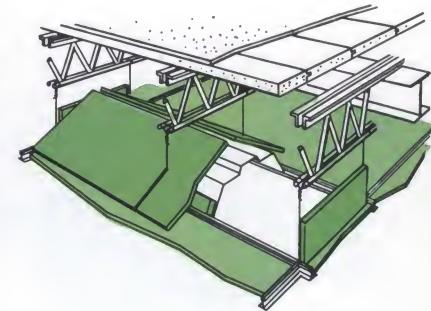
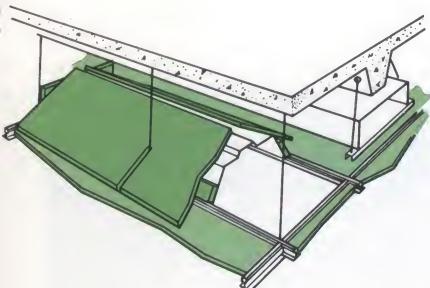
(was 226-3 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from steel floor and 2 $\frac{1}{4}$ " concrete deck above.**3-Hr. UL Design A207 (Beam 4 Hr.)**

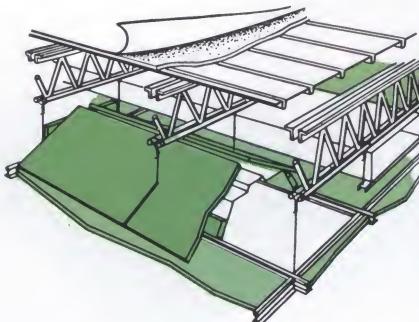
(was 65-3 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from cellular steel floor and 2 $\frac{1}{2}$ " concrete deck above.[†]**bar joist/gypsum plank deck****2-Hr. UL Design G230 (Beam 2 Hr.)**

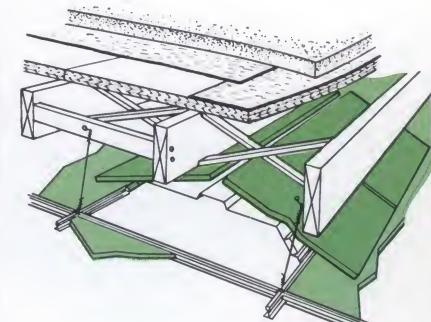
(was 293-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from bar joists with USG Gypsum Floor Plank and $\frac{3}{4}$ " MASTICAL Underlayment Compound above.**prestressed concrete T-beam/deck****2-Hr. UL Design J202**AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from prestressed concrete T-beam/deck.**bar joist/steel roof deck****1-Hr. UL Design P214**

(was RC-15-1 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from bar joists with 1 $\frac{1}{2}$ " steel roof deck and 1" noncombustible insulation above.**wood joists & subfloor****1-Hr. UL Design L206**

(was 31-1 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from 2x10 wood joists with 1" nom. wood floor or MASTICAL Floor Underlayment Compound above.

Special-Function AURATONE Panels and Tile *continued*

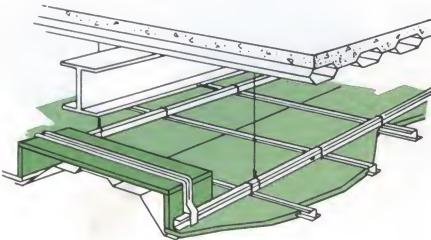
TILE

steel frame, floor/concrete deck

3-Hr. UL Design A009 (Beam 4 Hr.)

(was 59-3 Hr.)

AURATONE FIRECODE Tile, $\frac{3}{4}$ "x12"x12", suspended on concealed Z-spline system with cellular steel floor and 2 $\frac{1}{2}$ " concrete deck above.†

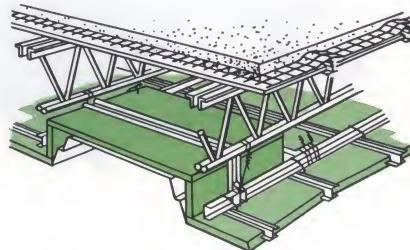


bar joist/poured gypsum deck

2-Hr. UL Design P002

(was RC-13-2 Hr.)

AURATONE FIRECODE Tile, $\frac{5}{8}$ "x12"x12", suspended on concealed Z-spline system hung from bar joists with 2 $\frac{1}{2}$ " gypsum roof deck poured on gypsum or mineral fiber formboard.†

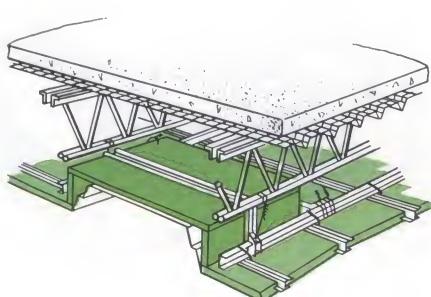


bar joist/concrete deck on riblath

2-Hr. UL Design G019

(was 84-2 Hr.)

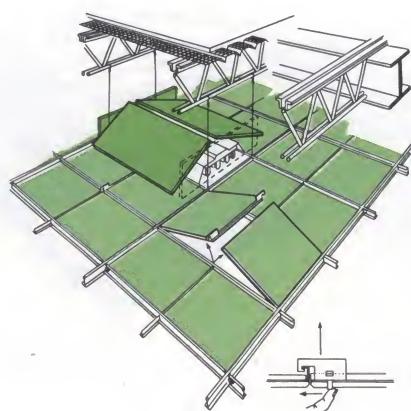
AURATONE FIRECODE Tile, $\frac{5}{8}$ "x12"x12", suspended on concealed Z-spline system hung from bar joists with 2 $\frac{1}{2}$ " concrete deck on riblath above.†



2-Hr. UL Design G008 (Beam 2 Hr.)

(was 281-2 Hr.)

AURATONE FIRECODE Tile, $\frac{5}{8}$ "x12"x12" or 24"x24", suspended on concealed accessible grid system with 2 $\frac{1}{2}$ " concrete deck on riblath over bar joists above.†



Fissured AURATONE Panels ► provide visual appeal and acoustical performance for indoor roller rink.

SKATELAND SKATE CENTER,
Brooklyn Park, Minn.
Architect:
DONALD E. FRY & Assoc., Inc.

†AIRSON AURATONE FIRECODE Tile may be substituted.

AURATONE PC Panels and Tile are provided with a special factory-applied plastic coating which reduces ceiling maintenance where high soiling is anticipated. The plastic surface has at least 10 times the washability of conventional acoustical surface finishes. Acoustical performance is virtually unaffected.

Non-Standard Sizes of AURATONE are available within the following limits on special order:

width	length
12" to 30"	24" to 60"

Consult local building officials for acceptance; UL label service not available for most non-standard sizes. Limits by product type may be obtained from U.S.G.



HI-LITE Noncombustible Panels and Tile . . . maximum ceiling performance for every dollar

Hi-LITE Acoustical Panels and Tile are designed for applications with budget limitations and requiring sound control performance and noncombustibility.

Available in one pattern (Filigree) and thickness ($\frac{5}{8}$ "") in one size each of panel (24"x24") and tile (12"x12"). Panels are supplied with **Shadow Line** edge for exposed grid installation, tile with beveled edge for either concealed grid or adhesive installation.

Hi-LITE Panels and Tile are noncombustible, providing an exceptional value in terms of maximum performance and beauty for every dollar budgeted.

Fire Resistance—Noncombustible; Federal Spec. SS-S-118a, Type III, Class 25, Fire Hazard Classification (ASTM E84 test procedure): flame spread 20, fuel contributed 15, smoke developed 20.

Thermal Resistance (R)—Panels: 2.27 ($\frac{5}{8}$ "")

Tile: 2.27 ($\frac{5}{8}$ "")

installed resistance:	heat flow up	heat flow down
$\frac{5}{8}$ " panel	3.90	4.60
$\frac{5}{8}$ " tile	3.50	4.20

Sound Ratings—Hi-LITE Panels and Tile range from 45 to 55 in NRC Average, and carry STC Ratings of 39 to 45 (see tables, pages 28 and 29). Density and thickness are major factors contributing to high sound attenuation of this product.

Light Reflectance—Class a.

limitations

Installation should not be made: (a) where continuously exposed to high humidity (over 80% RH); (b) below wainscot height or where exposed to impact, abrasion or tampering.

HI-LITE pattern



Filigree—A truly non-directional fissure, ideal pattern for large installations and general purpose decor.

Acoustics are improved in this office with attractive 24"x24" Shadow Line edge HI-LITE Panels.

SHELBY OAKS PLAZA BUILDING, Memphis, Tenn.

Architect: McFARLAND & Assoc., AIA



ACOUSTISORBER Space Units . . .

simple, low-cost, suspended sound absorbers that arrest plant noise build-up

High industrial noise levels are a problem largely due to the build-up of reverberant sound energy resulting from a lack of adequate sound-absorptive surfaces. Newly developed to meet this widespread need are ACOUSTISORBER Space Units. Metal-framed and plastic film-encased, these mineral fiber pads are suspended overhead to effectively control such noise. Each unit, 1-in. thick and measuring 20"x24", is simply installed on prehung parallel wires in a spacing pattern determined from the calculated noise reduction.

Since ACOUSTISORBER Space Units absorb sound on *both sides*, their Sound Absorption Coefficient is an exceptional 1.5 sabins per sq. ft. of unit, compared with .04 for steel roof deck, .07 for painted concrete block walls or wood floors, and .02 for concrete floors (values at 1000 Hz). As a bonus, the high reflectivity of the white PVC plastic film helps to boost brightness levels in dimly-lit areas. The spacing pattern should be as balanced as possible, but is not critical and an irregular pattern does not compromise the units' efficiency. Overhead fixtures and utilities need not be moved, for ACOUSTISORBER Units can be hung around them.

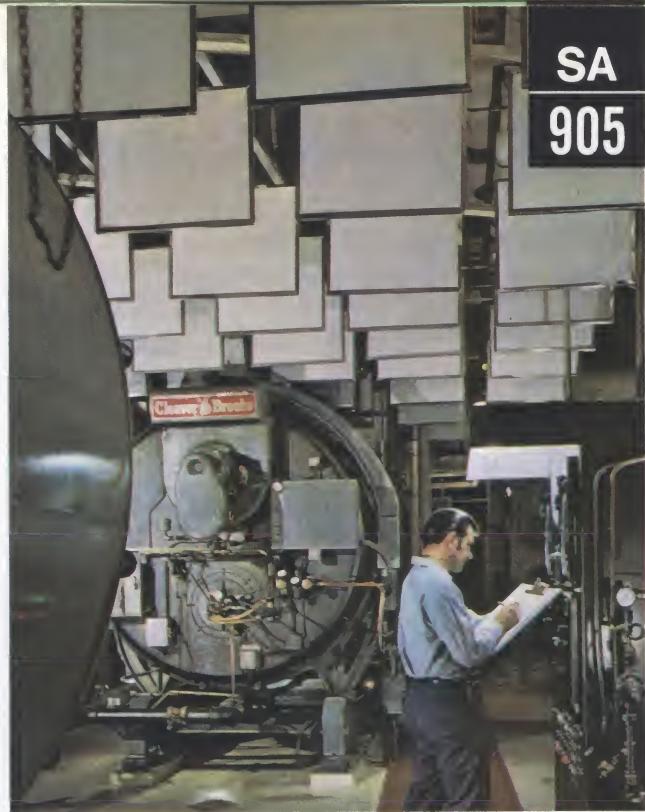
Fire Resistance—ACOUSTISORBER Space Units are noncombustible. Fire hazard classification (ASTM E84 test procedure): flame spread 0, fuel contributed 15, smoke developed 5.

Sound Rating—As tested by Riverbank Acoustical Laboratories (test no. A-72-90) ACOUSTISORBER Space Units 1 ft. apart in rows 3 ft. o.c. showed sound absorption characteristics as follows:

frequency (Hz)	125	250	500	1000	2000	4000
absorption (sabins per 20"x24" unit)	0.7	1.7	3.2	5.0	5.3	3.9

For complete data on absorption and procedures for calculating the number of units required, see U.S.G. Folder SC-811.

Limitations—ACOUSTISORBER Units (1) reduce only reverberant sound energy; sound direct from source to listener is unaffected; (2) are effective as sole treatment only for sound level reductions of approximately 7 db or less, thus are recommended for reductions greater than 7 db only in combination with other forms of acoustical treatment, most effectively at the source; (3) must be located to not interfere with fire-protection sprinkler operation; (4) are not recommended for use in areas where temperatures exceed 150°F.



Easily-installed ACOUSTISORBER Space Units help keep irritating, damaging noise levels down, personnel comfort and morale up.

Non-Acoustical Ceiling Materials . . . for specialized applications

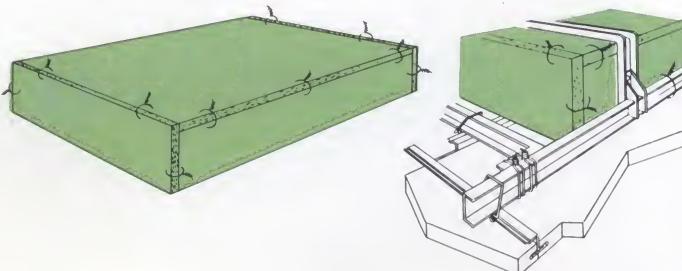
USG Asbestos Board, $\frac{3}{16}$ " thick in nom. 24"x24" and 24"x48" sizes, is supplied either Perforated or Unperforated, for lay-in use in ceiling grid systems. Square-edged or beveled ($\frac{1}{16}$ " bevel on all four sides). Perforations, .197" dia., are spaced $\frac{1}{2}$ " o.c. White Rippletone texture finish. For other data, see table on page 4.

Other tile bases, where a noncombustible base for adhesive application of ceiling tile is required, include SHEETROCK and SHEETROCK FIRECODE gypsum panels, and ROCKLATH plaster base. See U.S.G. Folders SA-917, SA-927.

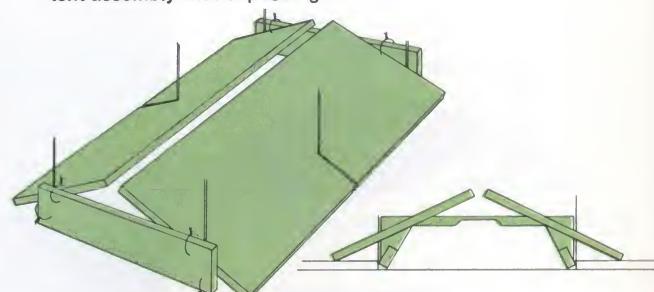
THERMAFIBER Light Fixture Protection brings packaged convenience to jobs using U.S.G. ceiling systems, whether panel or tile. This consists of $1\frac{1}{4}$ " thick semi-rigid mineral wool board wire-tied and suspended over fixtures. The assemblies (illustrated below) carry UL Labels covering board module ceiling designs of 1, $1\frac{1}{2}$, 2, 3 and 4 hours for which ratings have been established. They are adaptable to acoustical tile and panel ceiling constructions using either an exposed grid or concealed Z-spline suspension.

The THERMAFIBER package is shipped in one module for acoustical ceiling panels, and in three where tile is used.

box assembly with concealed Z-spline suspension



tent assembly with exposed grid



AIRSON Air Distribution Systems . . . optimum answer to constant comfort

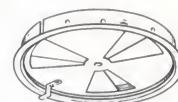
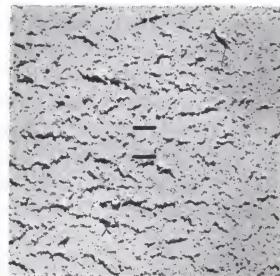
ACOUSTONE Tile and AURATONE Panels and Tile are supplied in four types and four popular patterns for use in the AIRSON Ceiling Air Distribution System. This system, with millions of square feet in use, employs openings in the tile or grid to distribute a wall-to-wall flow of heated or cooled air into a room. Unlike traditional methods of air distribution, the AIRSON Tile or Panel System is not dependent upon a costly and complicated system of air supply ducts and diffusers. Instead, it utilizes the plenum area above the ceiling to carry conditioned air to the room through individual tile or grid orifices. The continuous, uninterrupted beauty of the ceiling is preserved, as all visible diffusers are eliminated.

In the standard AIRSON Tile System, movable slides on the backs of the tiles (easily adjustable from below) act like small dampers to control the volume of air. Since each tile or panel is individually adjustable, the area can be zoned and balanced for comfort. The ceiling surface is installed on concealed Z-splines or exposed grid—either with all of the tile in the ceiling slotted to provide AIRSON jets, or with a percentage of tile unslotted.

The ACOUSTONE and AURATONE products used are specially designed for use with AIRSON. The bright, non-breathing, foil-back surface prevents seepage of air through the field of the tile and provides reflective insulation in the plenum space. The selection consists of $\frac{3}{4}$ " ACOUSTONE, either the regular or rated 120 version, in Fissured and Glacier patterns, 12"x12", 12"x24" and 24"x24" sizes; $\frac{5}{8}$ " AURATONE Panels, regular or FIRECODE, 24"x24" to 30"x60" sizes, and $\frac{5}{8}$ " or $\frac{3}{4}$ " AURATONE FIRECODE Tile, 12"x12" to 24"x24" size—in Fissured pattern. All are available plastic-coated if desired.

Two jet arrangements are offered: A-2, with two orifices per tile, and A-5, with five orifices placed parallel with the fissures of the tile. The A-2 orifice arrangement gives a 35% deeper penetration than A-5 at the same flow conditions, making it more suitable for high ceiling-low flow applications. Both have been proven by test far superior in penetration to ordinary perforated ventilating tile. For added flexibility, AIRSON AURATONE Panels may be furnished with either 25%, 50% or 100% slotting. A third type of tile available is unslotted.

In addition to the slotted tile suspension, AIRSON Grid systems are used with unslotted panels and tile. These are the steel AIRFLO T-2 Grid and T-4 Grid in which air distribution is accomplished through orifices at 2" intervals in the face of the tee. Both systems include complete metal accessories: slides, splines, mouldings, runners, spot jets, clips. Design, erection and specification are covered in U.S.G. AIRSON Air Distribution Systems brochure SC-504.



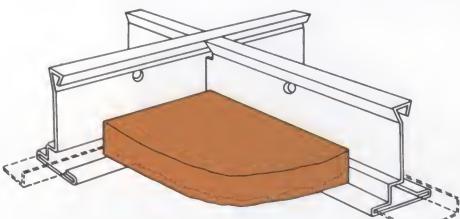
Spot Jet

AIRSON ACOUSTONE A-2 Tile

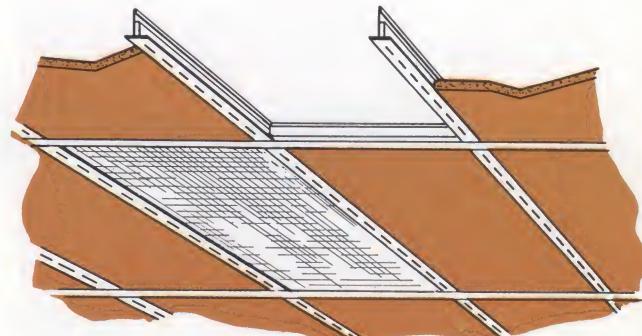
Top and bottom views of AIRSON ACOUSTONE A-5 tile (below) show foil and adjustable slides located on back of unit, and adjustment from face of unit made easily with ordinary ice pick for air flow control.



In the AIRSON AURATONE A-2 panel (below), adjustable damper slides on back provide control of air without removing the panel.



AIRFLO T-4 Grid



AIRFLO T-2 Grid



Classroom ceiling of Fissured AURATONE Panels uses the AIRFLO T-4 Grid System to distribute air evenly and quietly.

ANOKA SENIOR HIGH SCHOOL, Anoka, Minn.
Architect: ARMSTRONG, SCHLICHTING, TORSETH & SKOLD, Inc.



Elegance and comfort are combined in Glacier AIRSON ACOUSTONE Tile slotted A-2 in this architectural office.

VOSBECK, VOSBECK, KENDRICK, REDINGER Offices,
Alexandria, Va.
Architect: VOSBECK, VOSBECK, KENDRICK, REDINGER

Suspension Systems

concealed accessible Z-Spline systems

The concealed accessible systems are modified Z-spline suspensions designed to provide complete (or partial, where desired) accessibility to piping, electrical equipment, sheet metal work, and other mechanical devices in the plenum areas above the ceiling.

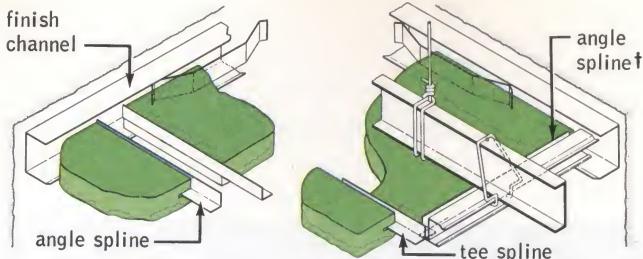
Removability of the tile is completely concealed; the appearance is that of standard Z-spline tile suspension. Only 1½" Z-spline and ¾" bevel edge 12"x24" tile are recommended for these systems, although they can accommodate ¾", 12"x12" tile.

concealed Z-Splines attached to 1½" carrying channel grillage

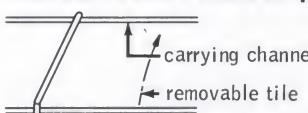
This method offers an economical, simple, rigid construction and permits the use of flush joints where lighting conditions are not too severe. Metal spline supports are provided in kerfs along the four edges of each unit. Splines also act as a continuous seal to minimize air travel through the joints. Self-leveling of the tile joints is assured since intersecting corners of four adjacent units are supported on the same member.

concealed Z-Splines direct to bar joists

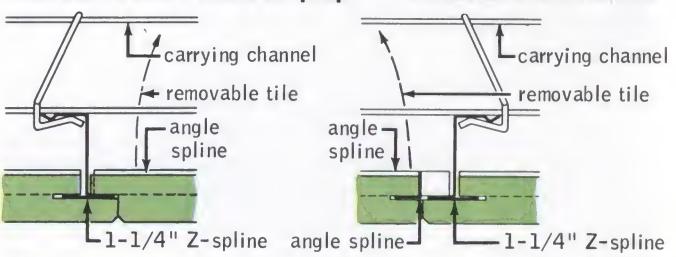
This method may be employed when bar joists are spaced a maximum of 5 ft. o.c. The Z-splines are attached direct to the bottom chord of the bar joist with the No. 87 clip. The saving gained by eliminating the 1½" channel is often lost in "shimming" since bar joists seldom form a true ceiling plane. It is therefore suggested this method only be used where headroom is critical.



concealed accessible shiplap

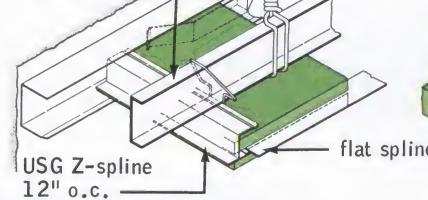


concealed accessible

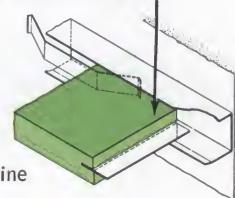


USG 1-1/2" channels

4'-0" o.c.

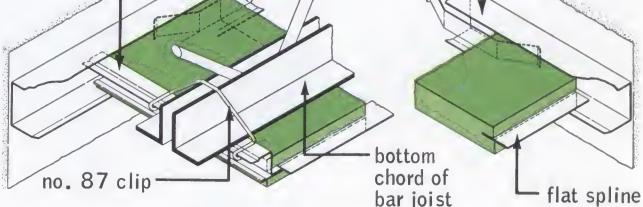


ACOUSTONE mineral acoustical tile



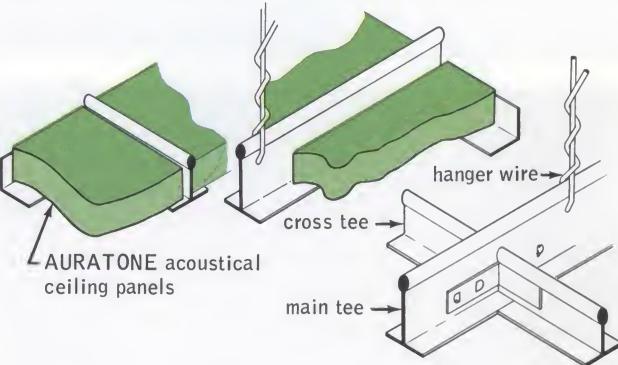
3/4"

Z-spline



direct-hung exposed grid

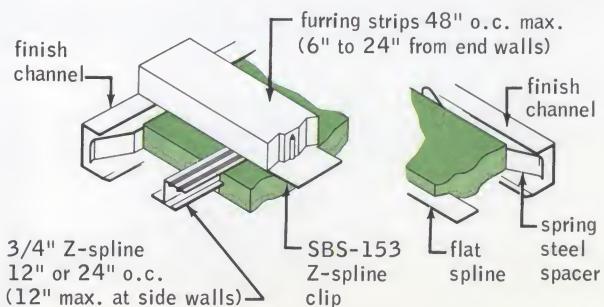
Because of its ease of installation, this method is economical and provides a low-cost acoustical ceiling with complete accessibility to the area above the ceiling. Any type lighting arrangement is easily adapted to it. Lighting troffers can be installed quickly and economically. Full advantage can be taken of the economy of gravity-held diffusers laid directly in the inverted tees to replace equivalent area of acoustical panels. This permits maximum flexibility of lighting arrangement.



wood furring direct attachment of Z-Spline

This method is particularly adaptable to existing ceilings where the surface is in such condition that it is impractical to attach tile by cementing.

Installation is by nailing wood furring strips, maximum spacing of 4 ft. o.c., and attaching Z-splines to the furring strips with the SBS-153 Clip. The SBS-153 Clip may also be used to attach Z-splines directly to existing wood joists or to wood furring strips nailed to exposed concrete surfaces.



**USG Accessories ...
the key to a perfect installation**

USG Metal Accessories for Ceilings are precision-made to assure performance of the U.S.G. Concealed Z-Spline and AIRSON Tile Air Distribution Systems. Ratings, erection and specification of all assemblies are covered in this catalog and U.S.G. brochures SC-504 and SC-505. Metal accessories are supplied in all groups including 16-ga. cold-rolled channels, finish channels, corner plates, various clips and splines, splices and angles.

systems	Z-spline	Z-spline splice	no. 82A clip	SBS-153 Z-spline clip	no. 85 or 87 Z-spline clip	spring steel spacer	finish channel
Concealed Z-Spline	3/4"	3/4"	X	X	X	X	X
AIRSON	3/4"	3/4"	X		X	X	X

	finish channel corner plate	flat splice	.054 tee spline	A-5 AIRSON slide	R & L split angle	spot jet
Concealed Z-Spline	X	X	X			
AIRSON	X	X	X	X	X	X

AIRFLO	AIRFLO T-splice	AIRFLO T-lock	AIRFLO T-2 runner & tape	AIRFLO-T4 tee
	AIRFLO T-2 runner	AIRFLO T-lock M	T-slide & AIRFLO T-2 runner	X

NOTE: X—denotes use with the particular system —concealed Z-spline, AIRSON Air Distribution System, or AIRSON AIRFLO Ceiling Grid.

sound absorption/flame resistance/light reflection

product	thickness	mounting	sound absorption coefficients								NRC range	light refl. class	flame resistance SS-S-118a class	flame spread E84 Index	unit size tested
			125	250	500	band center frequency	1000	2000	4000						
ACOUSTONE Tile "F" Fissured	3/4"	1	.09	.26	.79	.97	.84	.91	.65-.75	a	25	15	12"x12"		
		7	.58	.62	.58	.79	.94	.97	.70-.80	a	25	15	12"x12"		
Glacier	3/4"	1	.10	.28	.81	.92	.84	.95	.65-.75	b	25	15	12"x12"		
Finesse	3/4"	7	.50	.58	.56	.81	.95	.99	.70-.80	b	25	15	12"x12"		
Seacrest	3/4"	7	.48	.53	.55	.77	.85	.83	.65-.75	a	25	15	12"x12"		
		7	.34	.34	.69	.93	.98	.99	.70-.80	b	25	15	24"x24"		
ACOUSTONE db Tile Fissured	3/4"	7	.45	.46	.62	.91	.96	.98	.70-.80	a	25	15	12"x12"		
Glacier	3/4"	7	.30	.46	.77	.99	.89	.90	.75-.85	b	25	15	12"x12"		
ACOUSTONE "90" Fissured	3/4"	7	.83	.73	.68	.87	.93	.73	.75-.85	a	25	15	12"x12"		
ACOUSTONE "120" Fissured	3/4"	7	.52	.50	.60	.95	.99	.97	.70-.80	a	25	15	12"x12"		
ACOUSTONE "180" Fissured	3/4"	7	.45	.48	.62	.97	.96	.96	.70-.80	a	25	15	12"x12"		
ACOUSTONE "PC" Fissured	3/4"	1	.22	.21	.78	.99	.78	.59	.65-.75	a	25	15	12"x12"		
		7	.70	.63	.67	.82	.86	.62	.70-.80						
MOTIF'D ACOUSTONE Striated	3/4"	1	.03	.26	.77	.93	.83	.78	.65-.75	a	25	15	12"x12"		
		7	.80	.69	.66	.86	.90	.87	.75-.85	a	25	15	12"x12"		
MOTIF'D ACOUSTONE "db" Galaxy	3/4"	7	.58	.46	.69	.91	.80	.76	.65-.75	a	25	15	12"x12"		
AIRSON ACOUSTONE "A-2" Fissured, slotted (1)	3/4"	7	.85	.49	.68	.98	.92	.88	.70-.80	a	25	15	12"x12"		
AIRSON ACOUSTONE "A-5" Fissured, slotted (2)	3/4"	7	.81	.48	.65	.94	.93	.84	.70-.80	a	25	15	12"x12"		
AURATONE Panels Fissured	5/8"	7	.35	.38	.61	.75	.59	.54	.55-.65	a	25	25	24"x48"		
	3/4"	7	.37	.46	.74	.94	.81	.79	.70-.80	a	25	25	24"x48"		
Pin-Perforated	5/8"	7	.35	.40	.64	.72	.50	.40	.50-.60	a	25	25	24"x48"		
	3/4"	7	.35	.46	.76	.95	.76	.64	.70-.80	a	25	25	24"x48"		
Random (4)	5/8"	7	.40	.46	.60	.99	.87	.88	.50-.65	a	25	25	24"x48"		
Filigree	5/8"	7	.33	.39	.60	.75	.65	.66	.55-.65	a	25	25	24"x48"		
Nordic	5/8"	7	.35	.35	.62	.72	.51	.41	.50-.60	a	25	25	24"x48"		
AURATONE FIRECODE Panels Fissured	5/8"	7	.29	.37	.66	.74	.59	.53	.55-.65	a	25	25	24"x48"		
Pin-Perforated	5/8"	7	.28	.38	.70	.71	.51	.40	.55-.65	a	25	25	24"x48"		
Filigree	5/8"	7	.31	.36	.66	.76	.65	.65	.55-.65	a	25	25	24"x48"		
AIRSON AURATONE Panels Fissured, 50% A-5 Slotted (2) 50% A-2 Slotted (1)	5/8"	7	.29	.33	.58	.79	.66	.57	.60-.70	a	25	25	24"x48"		
	5/8"	7	.27	.34	.58	.82	.71	.60	.60-.70	a	25	25	24"x48"		
AIRSON AURATONE FIRECODE Panels, Fissured 50% A-5 Slotted 50% A-2 Slotted	5/8"	7	.29	.34	.59	.71	.64	.57	.55-.65	a	25	25	24"x48"		
	5/8"	7	.27	.32	.58	.72	.61	.63	.55-.65	a	25	25	24"x48"		
AURATONE FIRECODE HF Panels Pin-Perforated	3/4"	7	.27	.32	.64	.76	.64	.57	.60-.70	a	25	25	24"x48"		
AURATONE Tile Fissured	3/4"	7	.40	.38	.68	.79	.69	.64	.60-.70	a	25	25	12"x12"		
Pin-Perforated	3/4"	7	.41	.43	.68	.86	.73	.59	.65-.75	a	25	25	12"x12"		
	5/8"	7	.43	.40	.54	.92	.88	.68	.65-.75	a	25	25	12"x12"		
Random (6)	5/8"	1	.06	.13	.67	.99	.86	.72	.60-.70	a	25	25	12"x12"		
	1/2"	1	.02	.15	.58	.98	.71	.49	.55-.65	a	25	25	12"x12"		
Filigree	3/4"	7	.43	.34	.62	.93	.79	.58	.60-.70	a	25	25	12"x12"		
	1/2"	1	.09	.24	.60	.63	.62	.54	.45-.55	a	25	25	12"x12"		
HI-LITE Filigree Panels Filigree Tile	5/8"	7	.39	.40	.67	.81	.75	.76	.60-.70	a	25	25	12"x12"		
AURATONE FIRECODE Tile Fissured	3/4"	7	.36	.39	.66	.87	.74	.62	.60-.70	a	25	25	12"x12"		
	5/8"	7	.42	.38	.60	.89	.76	.68	.60-.70	a	25	25	12"x12"		
Pin-Perforated	3/4"	7	.38	.39	.66	.88	.72	.51	.60-.70	a	25	25	12"x12"		
	5/8"	7	.41	.39	.62	.91	.72	.56	.60-.70	a	25	25	12"x12"		
Random (6)	3/4"	7	.34	.38	.69	.92	.71	.53	.65-.75	a	25	25	12"x12"		
	5/8"	7	.42	.39	.58	.87	.78	.73	.60-.70	a	25	25	12"x12"		
PERFATONE Acoust. Units Diagonal Perf.	1 1/16"	7	.85	.76	.82	.96	.79	.69	.80-.90	b	25	20	12"x24"		
Fire-Rated PERFATONE Diagonal Perf.	2 1/16"	7	.66	.72	.96	.99	.83	.67	.85-.95	b	25	20	12"x24"		

NOTE: All surfaces tested were painted. Mounting No. 1—adhesive application to gypsum board. Mounting No. 2—stapling or nailing to wood strips. Mounting No. 7—metal suspension system. Also see Footnotes, page 29.

sound attenuation properties

USG sound control ceilings

product	thick- ness	mount- ing	sound attenuation factors - db												unit size tested
			125	175	250	350	500	700	1000	1400	2000	2800	4000	STC	
ACOUSTONE db Tile Fissured	(Also see 16-freq. section below) 3/4"	ICF	28	33	33	34	38	41	44	49	54	>60	56	40-44	12"x12"
AURATONE Regular Panels Fissured	(Also see 16-freq. section below) 5/8"	IE	33	36	32	35	38	43	48	53	55	58	58	40-44	24"x48"
Pin-Perforated	5/8"	IE	34	37	33	36	40	43	47	53	54	58	58	40-44	
CE	29	38	32	34	36	39	45	46	53	54	58	58	58	40-44	
Pin-Perforated PC Random	5/8"	CE	30	37	33	34	36	41	46	50	54	54	52	40-44	
AIRSON A-5 Fissured	5/8"	IE	33	34	31	35	38	41	46	52	54	60	59	40-44	
AIRSON A-2 Fissured	5/8"	CE	25	33	26	30	32	35	41	48	51	52	50	35-39	
AURATONE FIRECODE Panels Fissured	5/8"	CE	29	34	32	38	38	43	47	48	52	53	52	40-44	24"x48"
Pin-Perforated	5/8"	CE	31	38	35	39	40	46	47	48	53	53	49	40-44	
AIRSON A-5 Fissured	5/8"	CE	25	34	27	31	33	38	42	44	49	50	47	35-39	
AIRSON A-2 Fissured	5/8"	CE	28	36	31	33	36	40	46	46	52	53	52	35-39	
AURATONE Regular Tile Fissured	3/4"	CCF	30	36	35	41	40	44	50	54	57	>60	55	40-44	12"x12"
	3/4"	CCT	33	35	35	42	44	47	52	58	59	>60	57	45-49	24"x24"
Pin-Perforated	5/8"	CCF	29	33	29	34	34	37	42	49	56	58	54	35-39	12"x12"
	5/8"	CCT	30	34	31	38	37	42	49	51	>60	>60	40-44	24"x24"	
AURATONE FIRECODE Tile Fissured	3/4"	CCF	31	34	32	39	40	43	49	51	58	>60	>60	40-44	12"x12"
	5/8"	ICF	36	38	31	39	41	42	50	55	>60	>60	>60	45-49	12"x12"
Pin-Perforated	3/4"	ICF	38	38	36	45	45	48	53	56	>60	>60	>60	45-49	12"x12"
	5/8"	ICF	34	37	32	41	42	45	51	57	64	67	65	45-49	12"x12"
Random	5/8"	CCF	39	38	30	42	41	45	51	55	63	68	64	40-44	12"x12"
Fire-Rated PERFATONE Units Diagonal Perf. (8)	2 1/16"	IC	27	33	28	28	33	38	44	50	48	46	34	30-34	12"x24"

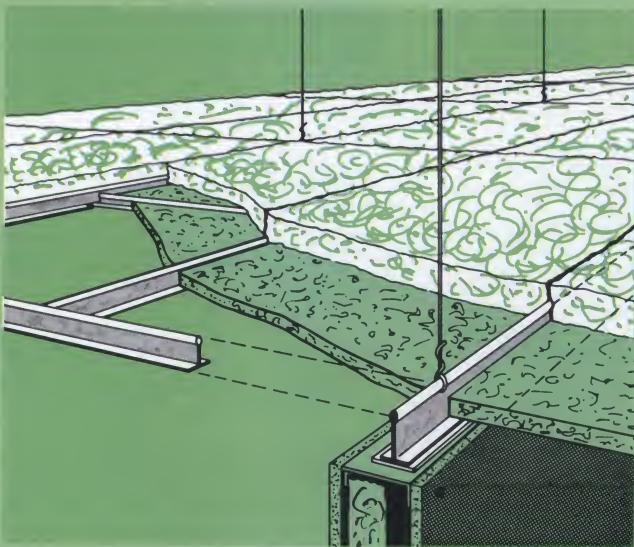
product	thick- ness	mount- ing	sound attenuation factors - db												unit size tested					
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	STC	
ACOUSTONE Tile Fissured	3/4"	Ad(5)	37	44	46	43	48	52	53	51	52	57	60	>60	>60	>60	>60	55-60	12"x12"	
	3/4"	ICF	29	37	34	27	27	28	30	31	32	34	38	44	50	56	58	59	35-39	12"x12"
Finesse	3/4"	ICF	29	36	34	26	25	27	28	27	28	29	32	36	39	43	48	52	30-34	12"x12"
ACOUSTONE db Tile Fissured	3/4"	IET	29	38	36	29	30	33	34	34	36	39	43	46	51	54	54	56	35-39	12"x24"
	3/4"	CE(7)	27	34	36	29	30	34	36	40	40	42	44	43	44	44	46	47	40-44	24"x24"
Glacier Seacrest	3/4"	CE(7)	28	36	38	30	32	36	39	42	42	44	45	46	46	50	48	50	40-44	24"x48"
	3/4"	CE	28	34	35	29	29	32	33	37	39	40	40	44	45	45	46	47	35-39	24"x24"
ACOUSTONE "120" Tile Fissured	3/4"	ICX	32	39	38	32	32	36	38	38	40	44	46	52	56	>60	>60	>60	40-44	12"x12"
AIRSON ACOUSTONE Tile Fissured, 50% A-5	3/4"	ICF	28	34	33	26	26	29	30	31	33	36	40	45	49	52	52	55	35-39	12"x12"
AURATONE Panels Fissured	5/8"	IE	30	38	37	30	32	36	38	42	44	47	50	53	55	56	56	59	40-44	24"x48"
	3/4"	CE	30	40	38	30	29	34	36	40	44	48	52	55	56	56	58	40-44	24"x48"	
	CEa	34	43	40	31	34	39	44	50	55	60	>60	>60	>60	>60	>60	>60	45-49	24"x48"	
	CEa	29	38	39	32	32	39	44	49	54	60	60	60	60	60	60	60	60	40-44	24"x48"
	CEd	29	38	39	36	41	45	50	54	58	60	60	60	60	60	60	60	60	45-49	24"x48"
Pin-Perforated	5/8"	IE	32	39	36	31	32	36	37	40	44	48	52	55	58	59	58	>60	40-44	24"x48"
	3/4"	CE	31	40	39	31	30	34	36	40	44	49	53	56	58	58	58	>60	40-44	24"x48"
AURATONE FIRECODE HF Panels Fissured	3/4"	CE	30	37	38	31	30	35	34	40	43	47	50	53	55	56	56	57	40-44	24"x48"
HI-LITE Filigree Panels	5/8"	CE(7)	27	33	36	28	32	34	37	39	41	42	44	47	46	46	46	46	35-39	24"x24"
Filigree Tile	5/8"	CCF	31	36	40	33	34	40	40	42	46	48	50	55	57	57	57	>60	45-49	12"x12"
USG Gypsum Ceiling Panels	1/2"	CE	34	40	41	34	36	40	41	42	44	46	47	48	48	44	41	41	40-44	24"x48"
	5/8"	CE	33	42	43	37	38	42	43	45	46	47	47	48	46	44	43	42	40-44	24"x24"

NOTE: All test results shown are from independent recognized laboratories; all surfaces tested were painted. Abbreviations, mountings: IC—concealed suspension system, interrupted at partitions; ICX—same as IC but with accessible feature; Ad—adhesively attached; IE—exposed suspension system, interrupted at partitions; IET—same as IE but with concealed tees supporting tile in one direction; CE—exposed suspension system, continuous at partitions; ICF—concealed suspension system, interrupted at partitions, flat spines; CCF—concealed suspension system, continuous at partitions, flat spines; CCT—same as CCF, except with tee spines; CEa—same as CE, but with one layer 1 1/2" Sound Attenuation Blanket placed above ceiling, continuous; CEd—same as CE, but with two layers 1 1/2" Sound Attenuation Blankets placed above ceiling, 4 ft. in each direction from partition. See also Footnotes below.

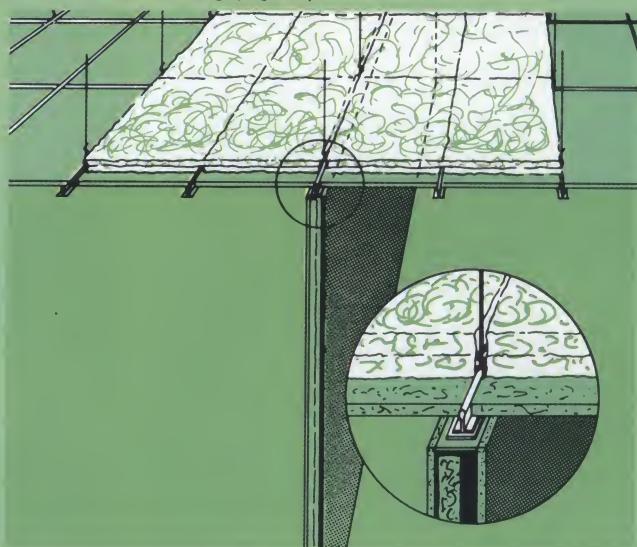
(1) Tile penetrated with two slots for AIRSON Tile Air Distribution System. (2) Tile penetrated with five slots for AIRSON Tile Air Distribution System. (3) Perforated in a random, pin-hole pattern. (4) Perforated 445 holes per sq. ft., 97 of 3/16" and 348 of 1/2" dia. (5) Tile adhesively attached to 1/2" gypsum panels screw-attached to indirect-hung suspension. (6) Perforated 437 holes per sq. ft., 98 of 3/16" and 339 of 1/2" dia. (7) Suspended on exposed T-grid. Tile is face-rabbeted on four edges. (8) Tested ceiling continuous at partition.

Wool-backed Panel Systems

Mounting CEa—Sound Attenuation Blankets over entire ceiling
—using $\frac{3}{4}$ " AURATONE Fissured Panels—STC 45-49
(see 16-freq. test listing, page 29)



Mounting CEd—Double-layer Blankets 4 ft. each side of partition
—using $\frac{5}{8}$ " AURATONE Fissured Panels—STC 45-49
(see 16-freq. test listing, page 29)



specifications

notes to architect

- United States Gypsum-recommended contractors are highly trained specialists in the installation and design of U.S.G. sound control systems. They are well-equipped to survey your job, make recommendations and estimates, and help solve functional and esthetic problems that may be encountered. Should the problem be beyond the scope of a U.S.G. contractor, he will recommend a competent acoustical consultant who may advise you.
- U.S.G. sound control contractors will usually arrange for layouts and detailing for jobs. Architects may, however, prefer to furnish the layouts.
- U.S.G. acoustical products, except AURATONE FIRECODE HF, are designed for installation and use under standard occupancy conditions at no more than 80% RH.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify areas to receive this acoustical treatment.

1.1.1 work included (AIRSON)—AIRSON Air Distribution System including acoustical material and suspension system, zoning and sealing of plenum space.

1.1.2 work by others (AIRSON)—Heating and cooling plants including ductwork to plenum zones, wall and ceiling return-air grilles, auxiliary heating and cooling units, electrical fixtures and other equipment to be

incorporated in the ceiling suspension systems. All overhead architectural, mechanical, and electrical work shall be completed prior to installation of the system.

1.2 qualifications

Construction conditions shall comply with ASTM C636. Acoustical material and suspension systems, including necessary hangers, grillage, splines, and other hardware supporting the acoustical material shall be furnished and installed by a (contractor approved) (AIRSON Contractor licensed) by United States Gypsum Company.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

Installation of acoustical tile and panels shall not begin until residual moisture from plaster, concrete or terrazzo work is dissipated. Before installation, the building shall be enclosed and permanent heating and cooling equipment in operation.

1.5 design conditions

System shall be rated NRC () in accordance with ASTM C423 and STC () in accordance with AMAI-II as tested by an independent agency.

Part 2: products**2.1 materials**

2.1.1 Acoustone Mineral Acoustical (Tile) (Panels) by United States Gypsum, (Glacier) (Fissured) (Finesse) (Seacrest) (Domino) pattern, white color, $\frac{3}{4}$ " thick, (length x width), (bevel) (square) (Shadow Line) edge, noncombustible class 25, molded mineral fiber units having natural fissured surface, 18 pcf min. density, (with non-breathing factory-applied aluminum foil backing,) (factory-applied acrylic plastic surface coating).

2.1.2 Motif'd Acoustone Mineral Acoustical Tile by United States Gypsum, (Georgian) (Striated) (Fantasia) (Galaxy) (Custom) pattern, white color, $\frac{3}{4}$ " thick, 12"x12", square edge, noncombustible class 25, molded mineral fiber units having natural fissured surface patterned by brushing, 18 pcf min. density, (with non-breathing factory-applied aluminum foil backing) (factory-applied acrylic plastic surface coating).

2.1.3 Acoustone (90) (120) (180) Mineral Acoustical (Tile) (Panels) by United States Gypsum, approved for UL Design No. (), () pattern, white color, $\frac{3}{4}$ " thick, (12"x12") (24"x24"), (square) (bevel) (Shadow Line) edge, 18 pcf min. density, (factory-applied acrylic plastic surface coating).

2.1.4 Airson Acoustone (120) Mineral Acoustical Tile by United States Gypsum, (approved for UL Design No. (), (Fissured) (Glacier) pattern, white color, $\frac{3}{4}$ " thick, (length x width), (square) (bevel) edge, noncombustible class 25, ()% A-2 slotted, ()% A-5 slotted, ()% unslotted, factory-applied non-breathing aluminum foil backing, 18 pcf min. density, (factory-applied acrylic plastic surface coating).

2.1.5 Acoustone Mineral Acoustical Space Units by United States Gypsum, (Finesse) (Glacier) pattern, white color, $2\frac{1}{4}$ " thick, $10\frac{1}{2}" \times 10\frac{1}{2}"$, 18 pcf min. density.

2.1.6 Auratone Acoustical Tile by United States Gypsum, (Pin-Perforated) (Random) (Fissured) (Filigree) (Nordic) pattern, ($\frac{1}{2}$ ") ($\frac{5}{8}$ ") ($\frac{3}{4}$) thick, (length x width), (staple flange) (butt bevel) (bevel with kerf) (24"x24" Shadow Line) edge, noncombustible class 25, mineral fiber ceiling tile, (factory-applied acrylic plastic surface coating).

2.1.7 Auratone Acoustical Panels by United States Gypsum, (Pin-Perforated) (Random) (Fissured) (Filigree) (Nordic) pattern, ($\frac{5}{8}$) ($\frac{3}{4}$) thick, (length x width), noncombustible class 25, mineral fiber ceiling panels, (factory-applied acrylic plastic surface coating).

2.1.8 Auratone Firecode Acoustical Tile by United States Gypsum, approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Random) (Nordic) pattern ($\frac{5}{8}$) ($\frac{3}{4}$) thick, (12"x12") (12"x24") (24"x24"), (tongue & groove) (bevel) (square) edge, (factory-applied acrylic plastic surface coating).

2.1.9 Auratone Firecode Acoustical Panels by United States Gypsum, approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Nordic) pattern, $\frac{5}{8}$ " thick, (length x width), (factory-applied acrylic plastic surface coating).

2.1.10 Auratone Firecode HF Acoustical Panels by United States Gypsum, approved for UL Design No. (), capable of withstanding temperature-humidity extremes, (Pin-Perforated) (Nordic) pattern, $\frac{3}{4}$ " thick, (length x width), (factory-applied acrylic plastic coating).

2.1.11 Airson Auratone Firecode Acoustical Panels by United States Gypsum, (approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Nordic) pattern, $\frac{5}{8}$ " thick, 24"x(24") (36") (48") (60"), noncombustible class 25, mineral fiber ceiling panels, ()% A-2 slotted, ()% A-5 slotted, ()% unslotted (factory-applied acrylic plastic surface coating).

2.1.12 Airson Auratone Firecode Acoustical Tile by United States Gypsum, approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Nordic) pattern, ($\frac{5}{8}$) ($\frac{3}{4}$) thick, (12"x12")

(24"x24"), (bevel) (tongue and groove) edge, noncombustible class 25 mineral fiber ceiling panels, ()% A-2 slotted, ()% A-5 slotted, ()% unslotted, (factory-applied acrylic plastic surface coating).

2.1.13 Hi-Lite Acoustical Panels by United States Gypsum, Filigree pattern, $\frac{5}{8}$ " thick, 24"x24", Shadow Line edge, noncombustible class 25, mineral fiber ceiling panels.

2.1.14 Hi-Lite Acoustical Tile by United States Gypsum, Filigree pattern, $\frac{5}{8}$ " thick, 12"x12" bevel edge, noncombustible class 25, mineral fiber ceiling tile.

2.1.15 Perfatone Acoustical Units by United States Gypsum, approved for 3-Hr. UL Design No. D004, (Diagonal Perf.) (Random Perf.) (Unperforated), ($1\frac{9}{16}$) ($2\frac{13}{16}$) thick, (12"x12") (24") (36") (48"), noncombustible class 25, (24-ga. steel) (.025") aluminum pans with mineral fiber sound-absorbent pads supported on formed wire mesh.

2.1.16 fire-rated suspension—Per UL Design No. ().

2.1.17 concealed spline suspension— $\frac{3}{4}$ " Z-spline spaced 12" o.c., attached to $1\frac{1}{2}$ " channel grillage. Flat metal splines engage adjacent tile.

2.1.18 one-way exposed spline suspension (48")—Commercially available suspension system meeting "intermediate" (or better) structural standards of ASTM C635, having main member exposed, supporting acoustical tile on all four sides using appropriate angle or tee splines between adjacent tile.

2.1.19 exposed grid (or shadow line) suspension—Inverted tee, direct hung system meeting "intermediate" (or better) structural standards of ASTM C635.

2.1.20 concealed accessible (shiplap) spline suspension— $\frac{1}{4}$ " Z-spline spaced 24" o.c., attached to $1\frac{1}{2}$ " channel grillage. Back-to-back angle splines engage adjacent tile to provide (specify %) accessibility to plenum. Tee and angle splines support remaining tile.

Part 3: execution

3.1 suspended—Install acoustical material and suspension system, including necessary hangers, grillage, splines and other hardware supporting the acoustical material in accordance with UL Design No. () and ASTM C636.

3.2 fissured tile—Intermix tiles from 4 or more cartons to obtain uniform distribution of fissure variations.

3.3 adhesive—Apply acoustical material, using an adhesive manufactured specifically for applying acoustical tile, in accordance with adhesive manufacturer's directions. Insert fiber splines in kerfs at corners of units.

3.4 Acoustone Space Units—Install Space Units with (Spin-on) (Snap-on) Wall Clip attached with suitable fasteners to wall or ceiling. Attach (Spin-on) (Snap-on) Clip to Space Unit with $1\frac{1}{2}$ " USG Type G Bugle Head Screw or #10-24 machine screw.

3.5 air distribution

a. Attach Airson slides to the back side of all except center A-5 tile slots so that air passage through the slots can be controlled from the room side of the tile by means of a pointed instrument without removing the (tile) (panels) from the ceiling.

b. Check all drawings and job conditions and ascertain code or other requirements for covering and sealing the top and sides of the plenum space above the ceiling. Seal the plenum space tight against air leakage. Insulate all walls of the plenum space exposed to outside temperatures with insulation rated at least R-11 installed resistance.

c. Furnish zone barriers and install where shown on drawings. Turn top edge at least 2", coat with adhesive, and permanently hold in place with sheet metal angle fastened securely. Lap all edges at least 2" and cement together. Lap bottom edges at least 3" on the back of the (tile) (panels) and cement directly to the (tile) (panels).

SA

905

USG sound control ceilings

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, ACOUSTONE, MOTIF'D, AIRSON, AURATONE, ACoustisorber, PERFATONE, FIRECODE, SHEETROCK, ROCKLATH, TEXOLITE, THERMAFIBER, AIRFLO, MASTICAL, HI-LITE, DURABOND.

Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

U.S.G. SALES OFFICES: **ALABAMA:** Birmingham, 870-7970 • **ARIZONA:** Phoenix, 274-5461 • **CALIFORNIA:** Fremont, 792-4400; Los Angeles, 388-1171 • **COLORADO:** Denver, 388-6301 • **DISTRICT OF COLUMBIA:** Washington, 223-8266 • **FLORIDA:** Jacksonville, 396-1628; No. Miami Beach, 949-3436; Tampa, 253-5325 • **GEORGIA:** Atlanta, 393-0770 • **ILLINOIS:** Chicago, 321-4100 •

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UNITED STATES GYPSUM
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

SA

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CDI environmental ceilings

system folder



CEILING DYNAMICS
1975-1

13 P

INTEGRATED CEILINGS
acoustical, air distribution, lighting



CEILING DYNAMICS, A DIVISION OF UNITED STATES GYPSUM

FEATURES OF CDI PRE-ENGINEERED, INTEGRATED ENVIRONMENTAL CEILING ASSEMBLIES

- maximum design flexibility
- glare-free lighting
- adjustable air distribution
- efficient sound control
- noncombustible fire protection
- economical installation

Total concept

Environmental ceilings have received widespread acceptance because of their multi-functional performance, flexibility to meet design needs and savings in initial operating costs. These integrated assemblies combine suspension, ceiling finish, lighting, air distribution and sound control into one subsystem. They make it easier to design, specify, coordinate, control and install interior ceiling systems.

Single responsibility

With this approach, one contractor is responsible for the final system's performance and appearance, eliminating multiple supervision common to standard ceiling construction. Because the systems are engineered at the factory, components interface properly and provide predictable results. The high cost of fabrication and installation in the field is eliminated.

Job-proven

Backed by a record of hundreds of successful jobs, Ceiling Dynamics, offers architects and engineers a diverse series of systems and options to satisfy most design criteria. Suitable for all types of buildings, these assemblies are a boon to architectural creativity. Five basic systems, two of which are described here, are all integrated to provide engineered performance characteristics. The components of these ceilings can be varied or mixed to meet functional needs.

Flexible design

Architectural design is enhanced by coffered modules or flat ceilings in square, rectangular or one-way suspension systems that complement any ceiling shape. Many module sizes are available, and special modules may be engineered to mullion or column spacing. Steel or aluminum runners have low-sheen finish; exposed aluminum may be color-anodized to match other construction. Attachment and relocation of partitions are simplified; all systems are accessible and allow entrance to the plenum without damage to the components.

Lighting

Luminaires are manufactured specifically for each system with appropriate hardware and supports for easy, economical installation. Most fixtures rate exceptionally high on ESI and VCP scales and meet the scissors curve criteria without sacrificing lumen efficiency. Fixtures can be static or air-handling to control or utilize heat from lights.

Air distribution

A wide range of methods and techniques is available for air distribution including linear, perimeter and modular devices. Varying slot widths and inlet sizes permit distribution that meets most requirements. VARIAMATIC (variable volume, constant temperature) and AIRSON (pressurized plenum) Air Distribution Systems are also readily integrated into these assemblies.

Sound control

Acoustical panels for these assemblies are selected from United States Gypsum's broad variety of noncombustible mineral fiber products: AURATONE Panels in eight patterns with absorption up to .70-.80 NRC avg. and attenuation up to 40-44 STC; ACOUSTONE Panels in four patterns with absorption up to .75-.85 NRC avg. and attenuation up to 40-44 STC. If desired, ACOUSTONE Panels can be integrally colored to match or harmonize with surroundings.

CDI-approved contractors

To assure high-quality installation, CDI Environmental Ceiling Systems are available through dependable contractors carefully selected and licensed by Ceiling Dynamics. These recommended contractors are highly trained specialists in the design of the system and are well-equipped to survey the job, make recommendations and estimates and help architects and engineers solve functional and esthetic problems that may be encountered. Specifications, photometric and air distribution data are available from the contractor and from Ceiling Dynamics national and regional sales offices.

SAYVILLE HIGH SCHOOL, Sayville, Long Island, N.Y.
Architect: FREDERICK E. ALLARDT, Jr., AIA



MOD SERIES ENVIRONMENTAL CEILING SYSTEMS



DE VRY INSTITUTE OF TECHNOLOGY, Phoenix, Ariz.
Architect: CAUDILL, ROWLETT & SCOTT

High-performance modular systems offer esthetic design flexibility

The MOD Series Environmental Ceiling Systems provide a modular, fully accessible, coffered ceiling assembly with a great variety of options to meet esthetic and functional needs. The systems are available in standard modules as large as 6x6-ft. or in special sizes to meet spacing of other construction. Modules may be a combination of vaulted or flat panels, totally or partially illuminated.

The coffered design with luminaires at the apex provides uniform, glare-free and shadow-free lighting particularly suited to large, spacious rooms. The visual comfort probability (VCP) is higher than with the same number of fixtures in a flat ceiling.

The MOD V Ceiling System offers a 1-hr. fire rating—UL Design P222. The assembly tested consists of $\frac{5}{8}$ -in. AURATONE FIRECODE Ceiling Panels, 2x4-ft. light fixtures and linear air diffusers installed on a 60x60-in. MOD Grid System suspended from bar joists with 1 $\frac{1}{2}$ -in. steel roof deck and 1 $\frac{1}{16}$ -in. noncombustible insulation above.

This coffered design also provides as much as 20% more area for acoustical material than with conventional flat ceilings. The MOD V Ceiling System has achieved a 43 STC as tested by Geiger & Hamme, Inc. in accordance with AMA 1-II-1967 standards. The tested assembly consisted of AURATONE Ceiling Panels, 2x4-ft. light fixtures, main and cross runners with 2-in. wide regress installed in a 60x60-in. module.

A specially designed runner, available in various regress widths, provides for quiet, high-capacity air distribution with nine adjustable throw patterns. Partitioning is readily integrated with the ceiling and can be rearranged to provide flexible space control.

Design

Module size: 30x60-in., 48x60-in., 48x48-in., 60x60-in., 72x72-in. sizes are standard. Other sizes to meet special conditions, such as window wall or column spacing, are available on request.

Suspension system: main runner, cross runner and perimeter are formed of 24-ga. galvanized steel, finished white to match acoustical panels with non-specular black horizontal regress. Available with 1/2-in. deep, plain or perforated regress in widths from 1 to 4 in. in 1/2-in. increments or in special sizes to match mullion or partition widths. Other finishes available to correlate with the interior decor.

Illumination

Luminaires for MOD Series Ceilings are manufactured to strict Ceiling Dynamics specifications for high-efficiency lighting. Fixtures have 2, 4, or 8 F40 lamps and provide illumination levels up to 150 footcandles for small rooms, over 300 footcandles for larger spaces. Each fixture is tested in its appropriate vaulted configuration; data for 24x48-in. fixture shown at right. Photometric data for other fixtures are available from Ceiling Dynamics for design purposes.

Fixtures are fabricated from 22-ga. steel, with a bonderized white, reflective finish. They are suitable for use with all standard voltages and carry a UL label. Standard lenses are acrylic prismatic type in flat or wraparound designs; virtually all other types of lenses and diffusers are available. Fixtures with heat-exchange or air-handling features are available, if desired.

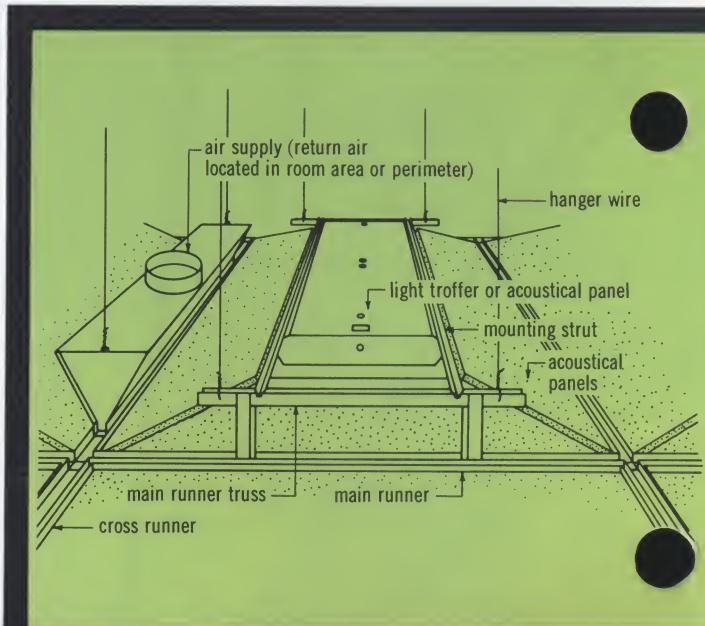
Fixture size: 5x48-in., 12x48-in., 24x24-in., 24x48-in., 30x30-in., 36x36-in., 48x48-in. sizes are available.

Air distribution

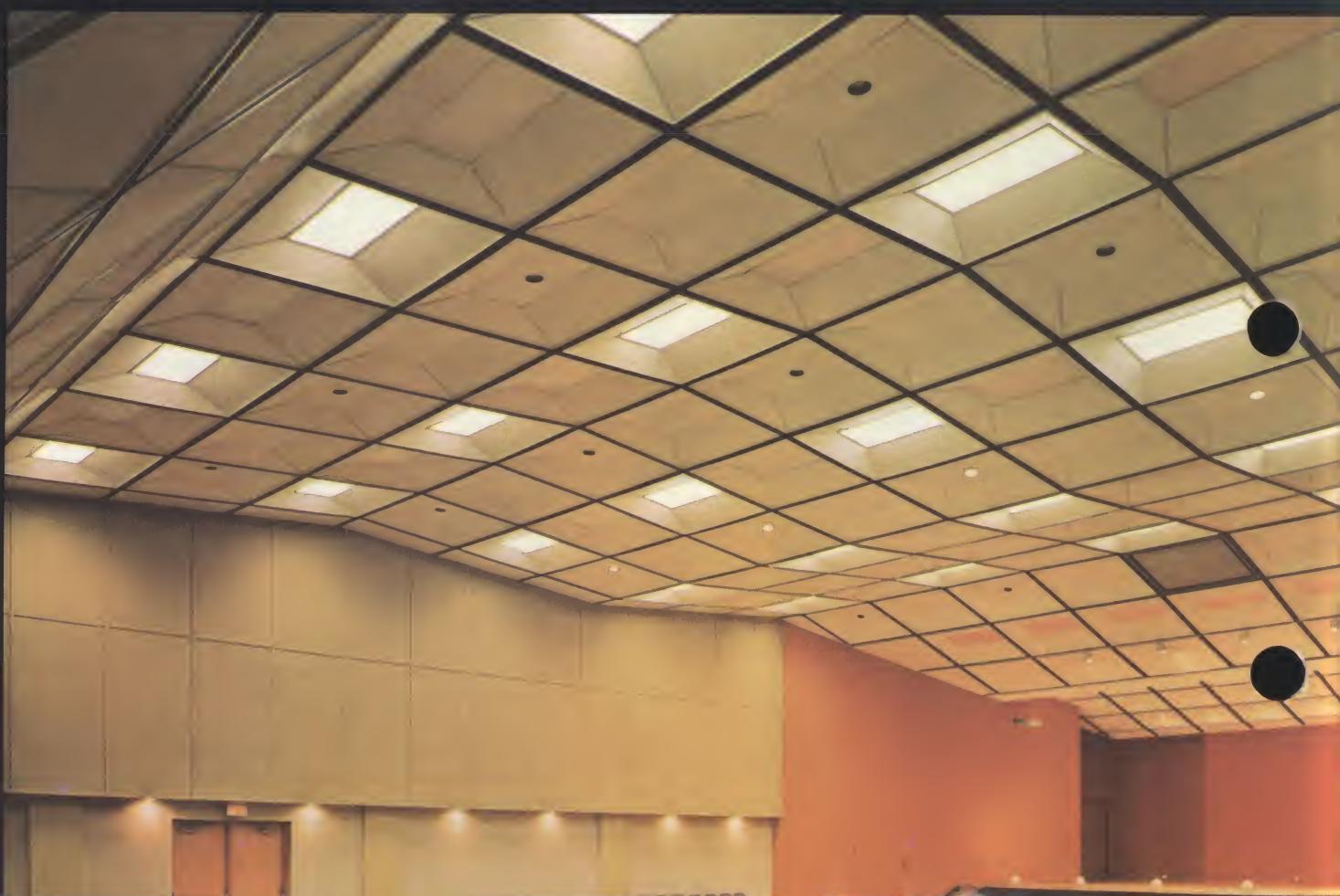
These systems feature ducted air terminals above the grid recess which provide sectionalized control and allow maximum flexibility in rearranging space. Each terminal contains two weirs which offer nine optional throw patterns and provide handy fingertip adjustment from below. Depending on the recess width, these terminals have capacities up to 400 cfm at NC 35 or less.

Specific performance data are available from Ceiling Dynamics for design purposes.

Return air is either ducted through the air terminals, returned to the plenum through the runners or perimeter which have slots or perforations in the regress, or handled through light fixtures. The light trap return, used over the runners, has an optional volume-control damper and acoustical lining for improving acoustical privacy.

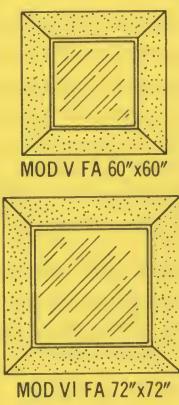


OCALA MUNICIPAL AUDITORIUM, Ocala, Fla.
Architect: HAL THOMAS REID, AIA

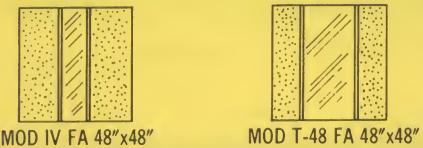


Reflected coffer views
Showing flat or wrap-around acrylic lens fixtures

Rgress Runner Series



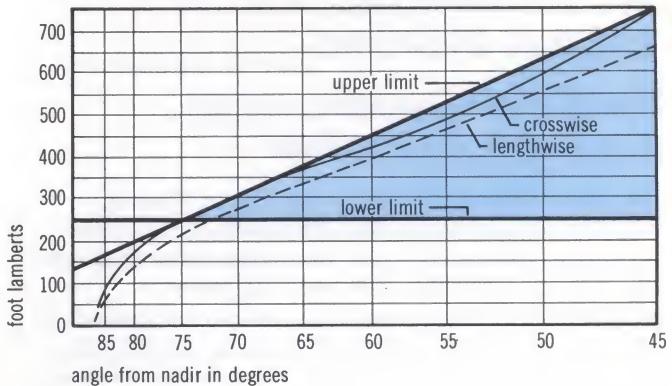
T-Runner Series



MOD SERIES

Average brightness curves

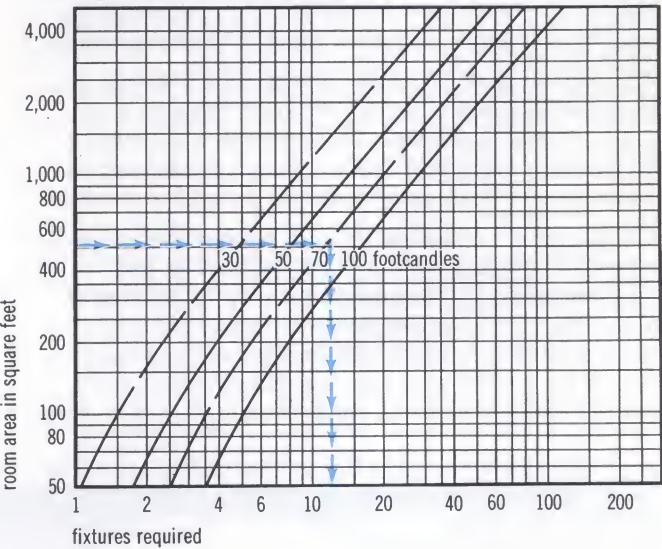
MOD-V Series Lighting Fixture: 2-lamp, 6" coffer, 2x4 ft.



Illumination levels data

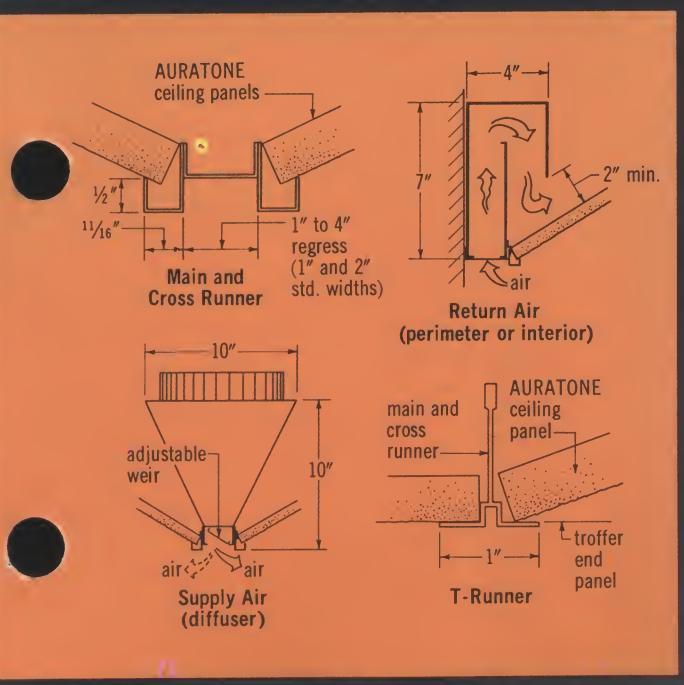
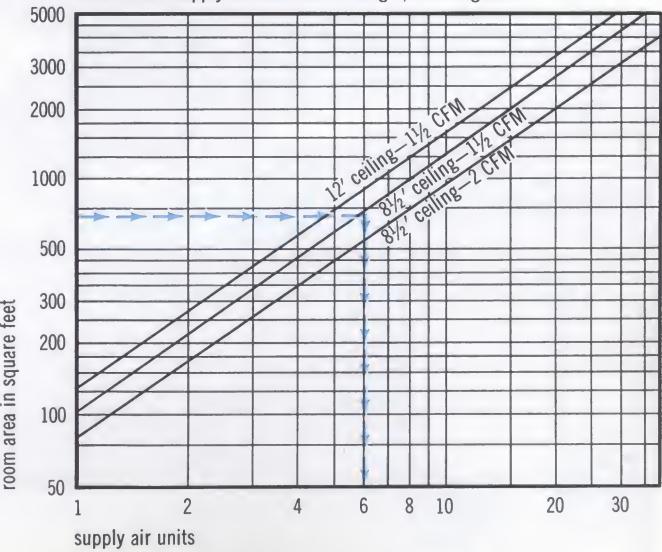
MOD Series Lighting Fixture: 2-lamp, 2x4-ft., acrylic prismatic lens, 75% maintenance factor.

Room reflectance: 80%/50%/20%; ceiling height: 9 to 10 ft.



Air-handling data

MOD Series Supply Air Unit: 48-in. length, 2-in. rgress.



DELTA SERIES

ENVIRONMENTAL CEILING SYSTEMS

Functionally integrated ceilings in beautiful classic design

The DELTA Series Environmental Ceiling Systems combine esthetic simplicity with maximum functional flexibility. The narrow, $\frac{5}{16}$ -in. wide suspension members are concealed by the heavy, bold fissures of ACOUSTONE Glacier pattern acoustical material which is edge-cut to finish flush with the runner. Air diffusers are integrated in the luminaires, located at the perimeter or handled on a modular basis, giving a large, clear expanse of uniformly textured ceiling.

These flat ceilings require less plenum space than vaulted or coffered designs and are fully accessible for maintenance and quick rearrangement of components. The unique runner with a continuous screw slot provides rigid structural support for partitions and accessories, making possible relocation without defacing the ceiling.

The DELTA Ceiling System has achieved a 40 STC as tested by Geiger & Hamme, Inc. in accordance with AMA-1-II-1967 standards. The assembly consisted of $\frac{3}{4}$ -in. Glacier ACOUSTONE db Panels suspended on main and cross runners installed in a 24x24-in. module.

Many sizes of luminaires, in plain, heat-exchange or air-handling types, each with acrylic lensing, offer maximum illumination with modular flexibility. Use of air-handling fixtures provides increased light output, reduced cooling system cost and operating savings. DELTA Series Systems offer the widest selection of options for distribution to meet virtually all design needs.

Design

Module size: 24x24-in., 30x30-in., 48x48-in., 60x60-in. sizes are standard. Other sizes up to 60x60-in. to meet planning requirements, are available on request.

Suspension system: DELTA Runners are of extruded 6063 alloy aluminum, with a continuous $\frac{1}{4}$ -20 screw slot, and a heavy-textured, frost-white enamel finish. Aluminum perimeter members are flush or have $\frac{1}{2} \times \frac{1}{2}$ -in. regress, adjustable controls and acoustical lining when used for air distribution. Perimeters are also available with solid blank-off and in a combination supply and return air member with drapery pocket.

Special colors: A series of integrally colored ACOUSTONE Acoustical Panels with matching suspension system is available.

Illumination

Luminaires for DELTA Series Ceilings are manufactured specifically for use in these systems and include all connecting hardware and supporting devices for fast installation. Fixtures have an unrestricted selection of lenses and/or diffusers and provide efficiency and illumination levels to meet most requirements. Fixture performance is tested in the integrated system; photometric data available from Ceiling Dynamics.

Fixtures, fabricated from 20-ga. steel with a bonderized white reflective finish, are suitable for use with all standard voltages and carry a UL label. Fixtures may have air supply and return slots or heat-exchange features in the frame.

Fixture size: 12x48-in., 24x24-in., 24x48-in., 30x30-in., 36x36-in. sizes are available.

Lens: Acrylic prismatic is standard; virtually all other types of lenses and diffusers are available.

INDEPENDENCE TOWER, Charlotte, N.C. • Architect: FEREBEE, WALTERS & ASSOCIATES



Air distribution

DELTA Series systems offer an unusually wide selection of integrated options for air distribution.

Linear diffusers: suitable for perimeter and interior zone air supply. Exterior wall units may include a combination supply and return member with drapery pocket.

Adjustable weirs provide six throw patterns and adjustable volume control in each slot. Units have one or two slots, slot widths and inlet sizes to meet all common capacity requirements. Acoustical lining and volume-control dampers, if required, are optional.

Perforated diffusers: available in 24x24-in. module to fit a variety of duct sizes. Provide supply air up to 900 cfm and handle return air up to 2,000 cfm at NC 35 or less, offer any combination or direction of 4-way throw.

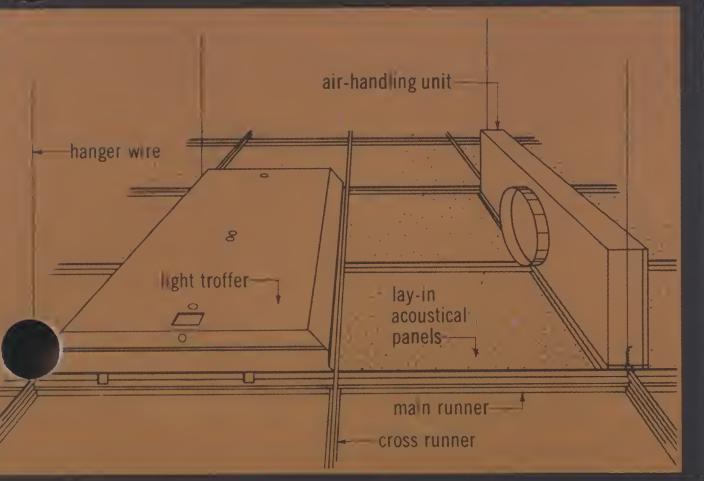
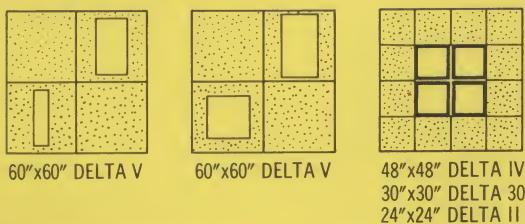
Acoustical lining and opposed-blade dampers optional.

Light-troffer diffusers: all light fixtures have optional frames with air-handling slots capable of delivering up to 200 cfm at NC 35. An air pack fits over the troffer when ducted delivery or return is required.

VARIAMATIC System: used with single duct, variable volume—constant temperature distribution of conditioned air. See page 8 for details on this economical system.

AIRSON System: conditioned air is supplied to the pressurized plenum and forced downward through specially engineered, damped orifices in the acoustical panels. The system circumvents design and maintenance problems of ceiling diffusers and delivers draft-free air and a controllable comfort level (see page 8 for details).

Reflected ceiling views showing flat acrylic fixtures



Heat exchange data

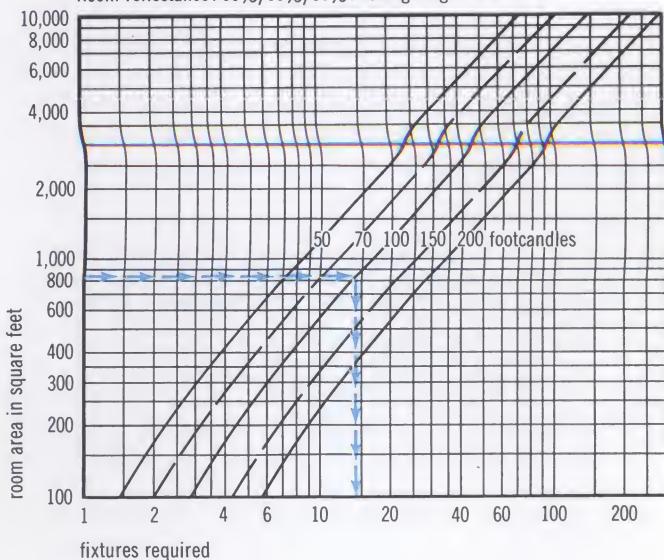
cfm	heat transfer (1) —BTU/hr	return air temp. —°F	relative light output-%
10	360	108	111
20	430	95	114
30	480	90	115
40	520	87	116
50	530	85	116
60	540	83	118
70	540	82	117

(1) Based on 75°F entering air temperature.

Illumination levels data

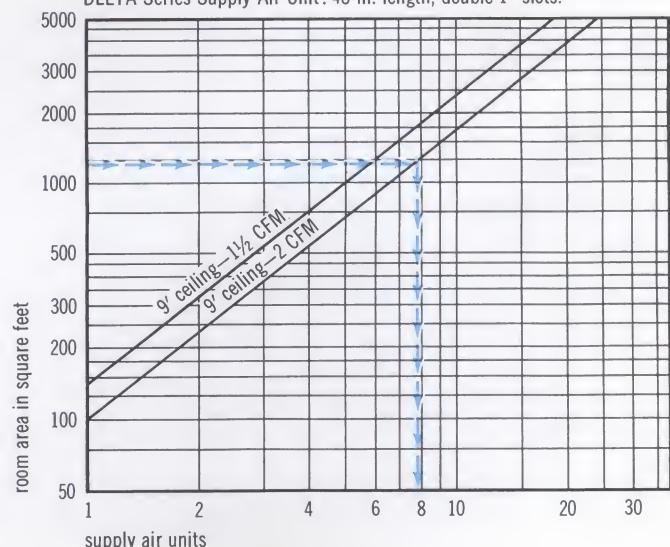
DELTA Series Lighting Fixture: 4-lamp, 2x4-ft. with two 2x2-ft. frames, acrylic prismatic lens, 75% maintenance factor.

Room reflectance: 80%/50%/30%: ceiling height: 9 to 10 ft.



Air-handling data

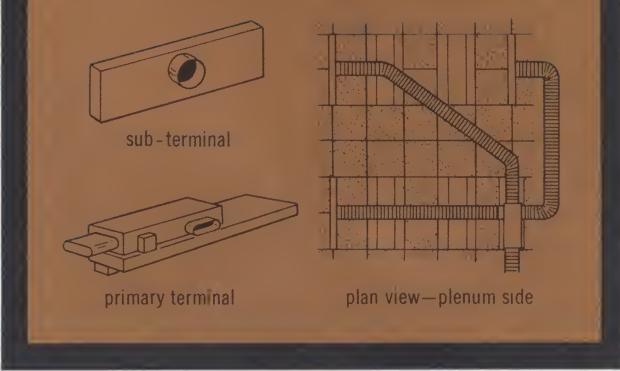
DELTA Series Supply Air Unit: 48-in. length, double 1" slots.



TECHNICAL DATA

CDI

ENVIRONMENTAL CEILING SYSTEMS



VARIAMATIC Air Distribution Systems

In the VARIAMATIC Air Distribution Systems, a variable volume of constant-temperature air is distributed to meet changing load requirements and offset heat created by lights and people. This popular concept offers superior comfort conditioning and zone control compared to conventional systems. It also reduces initial equipment cost and provides savings in operation.

Conditioned air, ducted to terminal units, is distributed to the space through two outlet slots which esthetically blend into the grid suspension. The modular design is integrated with the DELTA Series system. Terminals are available to fit most module sizes up to 60 in. and provide up to 240 cfm per unit. They are acoustically engineered and lined with a non-eroding, sound-absorbing material to assure low NC levels.

Sound absorption values

product	thick- ness	mount- ing	sound absorption coefficients						NRC range
			125	250	500	1000	2000	4000	
ACOUSTONE Tile									
Seacrest	3/4"	7	.34	.34	.69	.93	.98	.99	.70-.80
Glacier	3/4"	7	.60	.73	.73	.93	.88	.90	.75-.85
AURATONE Panels									
Pin-Perforated	5/8"	7	.30	.43	.74	.95	.73	.55	.65-.75
HI-LITE Tile									
Filagree	5/8"	7	.32	.30	.40	.58	.61	.62	.45-.55

Sound attenuation properties

product	thick- ness	mounting	sound attenuation factors—db														STC range	
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000
ACOUSTONE Tile																		
Seacrest	3/4"	CE	28	34	35	29	29	32	33	37	39	40	40	44	45	45	46	47
Glacier	3/4"	DELTA II (1)	30	36	38	31	31	33	36	38	39	41	42	45	47	48	49	50
AURATONE Panels																		
Pin-Perforated	5/8"	IE	32	39	36	31	32	36	37	40	44	48	52	55	58	59	58	>60
	5/8"	MOD V	26	34	36	34	34	36	39	42	43	43	44	48	49	49	49	50
HI-LITE Filagree Panels	5/8"	DELTA II (1)	26	33	36	29	31	35	36	40	40	42	43	45	47	48	48	48

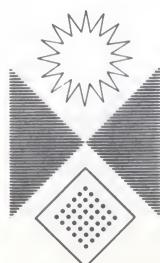
Footnotes—Sound Characteristics Tables. All test results shown are from independent recognized laboratories. (1) Suspended on exposed Delta grid. Tile is face-rabbeted on four edges. All surfaces tested were painted.

Primary terminals receive ducted air for distribution and govern up to three additional sub-terminal units. Volume control dampers in the primary unit, actuated by a wall-mounted or built-in thermostat, admit the exact quantity of cool air needed. Another built-in control prevents excessive flow caused by duct-pressure fluctuations. Field-adjustable dampers control the flow to the sub-terminals. Both primary and sub-terminals have rotating weirs which provide 1-way, 2-way and vertical throw patterns and have fingertip adjustment from below. The diffusers provide reasonably constant air motion for minimal and maximum flow without dumping. Specific air distribution data for design purposes are available from Ceiling Dynamics.

AIRSON Air Distribution Systems

In the AIRSON Air Distribution Systems, primary equipment supplies properly conditioned air to the plenum chamber above the acoustical ceiling. The air is forced through controlled jets in the ceiling to provide draft-free distribution and a controllable comfort level throughout the space. Suitable for both heating and cooling, the AIRSON Systems may be zoned to account for varying design requirements within the occupied space. Specific air distribution data for design purposes are available from Ceiling Dynamics.

Abbreviations, mountings: No. 7—metal suspension system; IE—exposed suspension system, interrupted at partitions; CE—exposed suspension system, continuous at partitions; MOD V—MOD V Series integrated ceiling system.



CEILING DYNAMICS

A DIVISION OF UNITED STATES GYPSUM
1845 Belcroft Ave.
So. El Monte, Calif. 91733 (213) 579-2652

CEILING DYNAMICS DIVISION REGIONAL SALES OFFICES: GEORGIA: Clarkson, (404) 233-2941 • ILLINOIS: Oak Brook, (312) 654-8970 • NEW YORK: New York, (212) 935-4434.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: ACOUSTONE, AURATONE, AIRSON, FIRECODE, VARIAMATIC, MOD, DELTA, CDI, HI-LITE.

Note: All products described here may not be available in all geographic markets. Consult nearest CDI sales office or representative for information.

partition applications

fire rating	description	test no.	stc rating	comments
			11-f 16-f	
1 hr.	Met Stud—1 layer $\frac{1}{2}$ " IMPERIAL FIRECODE "C" plaster base & veneer plaster— $\frac{3}{8}$ " USG studs—pl base screw att— $\frac{1}{4}$ " THERMAFIBER sound atten blks stapled one side—joints stag & taped— $\frac{1}{16}$ " IMPERIAL plaster—perimeter caulked wt 8 width $4\frac{1}{4}$ "	T-3124-OSU (f) CK-664-1 (s)		Fire test based on assembly with $2\frac{1}{2}$ " studs, without blankets. Stud spacing at 16" o.c. recommended
2 hrs.	Met Stud—2 layers $\frac{5}{8}$ " IMPERIAL FIRECODE plaster base & veneer plaster— $\frac{2}{3}$ " or $\frac{3}{8}$ " USG studs 24" o.c.—base layer screw att—face layer lamin or screw att—joints taped— $\frac{1}{16}$ " IMPERIAL plaster wt 12 width $6\frac{1}{2}$ "	UL Des U411 (was 11-2 hr) (f) TL-63-177 (s)	45 50	Excellent for corridors; sound performance based on perimeter caulking
2 hrs.	Met Stud—2 layers $\frac{1}{2}$ " IMPERIAL FIRECODE plaster base & veneer plaster— $\frac{2}{3}$ " USG studs 24" o.c.—pl base appl vert & joints stag—pl base screw att— $\frac{1}{16}$ " IMPERIAL plaster—perim caulked wt 10 width $4\frac{1}{4}$ "	UL Des U303 (was 27-2 hr) (f) CK 654-66 (s)		CK 654-66 based on assembly with 1" THERMAFIBER blankets.
2 hrs.	Met Stud—2 layers $\frac{1}{2}$ " IMPERIAL FIRECODE "C" plaster base & veneer plaster— $\frac{2}{3}$ " or $\frac{3}{8}$ " USG studs 24" o.c.— $\frac{2}{3}$ " THERMAFIBER sound atten blks stapled one side—pl base appl vert & joint stag—base layer screw att—face layer strip lamin or screw att—joints taped— $\frac{1}{16}$ " IMPERIAL plaster—perimeter caulked wt 10 width $4\frac{1}{4}$ "	UL Des U412 (was 28-2 hr) (f) USG-127-FT-G&H (s) Field Test KSO-1090072-a (s)	52 48 49	Sound test based on strip-laminated face layer. Field test includes 2 caulked outlets each side

ceiling applications

fire rating	description	test no.	sound rating	comments
			STC IIC	
2 hrs. (beam 2 hrs.)	$\frac{1}{2}$ " IMPERIAL FIRECODE "C" gypsum pl base & veneer plaster ceiling furred or susp—USG met fur chan—pl base att with screws 12" o.c.—joints taped— $\frac{1}{16}$ " IMPERIAL plaster— $\frac{1}{2}$ " conc on riblath or corrug stl deck over bar joist clg wt 4	UL Des G515 (was 221-2 hr) (f)	N/A	Spacing of furring channel at 16" o.c. recommended
3 hrs. (beam 3 hrs.)	$\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum pl base & veneer plaster ceiling—USG met fur chan—pl base att with 1" Type S screws 12" o.c.—joints exp or taped— $\frac{1}{16}$ " IMPERIAL plaster— $\frac{3}{8}$ " conc on riblath over bar joist clg wt 4	UL Des G512 (was 82-3 hr) (f)	N/A	Spacing of furring channel at 16" o.c. recommended

beam application

3 hrs. (beam only)	Gypsum Lath and Veneer Plaster Caged Beam Fireprfg— $\frac{1}{2}$ " USG stl run chan brackets 24" o.c.— $\frac{1}{8}$ " x $\frac{1}{8}$ " corner angles att to chan brackets—3 layers $\frac{5}{8}$ " IMPERIAL FIRECODE pl base att with Type S screws—1" 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints taped— $\frac{1}{16}$ " IMPERIAL plaster— $\frac{1}{2}$ " conc deck on fluted stl flr	UL Des N505 (was 214-3 hr) (f)		Fire rating for restrained assembly; 2-hr. rating for unrestrained assembly.
			N/A	Extends veneer plaster use to beam protection

For wall furring applications, see page 8.

description

In the IMPERIAL Plaster Systems a thin veneer ($\frac{1}{16}$ " to $\frac{3}{32}$ " thick) of specially formulated, high-strength gypsum plaster is applied over IMPERIAL Plaster Base. Either IMPERIAL Finish Plaster is applied in a single-coat system, or IMPERIAL Basecoat Plaster is used in a two-coat application as a superior base for IMPERIAL Finish Plaster, STRUCTO-GAUGE Gauging Plaster and lime, or Keene's-lime-sand-float finish.

IMPERIAL Plaster Base, 4' wide, has a high-strength, high-density core, either regular, FIRECODE or FIRECODE "C" type, covered with special absorption face paper designed for veneer plastering. Versatile IMPERIAL Base, as outlined below, is used with metal or wood studs or metal furring channels to meet design requirements for interior partitions and ceilings; party, chase and shaft walls; furring and column fireproofing.

1. USG Steel Studs, available in 7 widths (see Specifications, page 10), set in steel runners, with 1-layer, $\frac{1}{2}$ " thick IMPERIAL FIRECODE "C" Base, screw-attached to $2\frac{1}{2}$ " studs 16" o.c. This partition has a 1-hour fire rating, is suited for interior partitions and corridor walls. With double-layer $\frac{1}{2}$ " IMPERIAL FIRECODE "C" Base, attached by means of Type S screws to $2\frac{1}{2}$ " or $3\frac{3}{8}$ " studs spaced 24" o.c., a 2-hour fire rating plus sound control suitable for party walls is available. Where

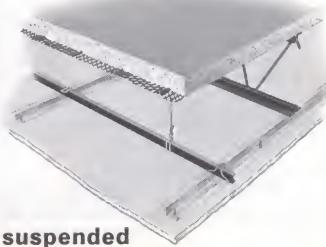
added partition width is required, double rows of USG Steel Studs are erected to provide chase walls with up to $20\frac{1}{4}$ " net pipe chase width (see page 6). Up to 4-hour column fire protection is also available (see separate System Folder SA-923).

"Series 4" partitions, of uniform 4" thickness, require one door frame, plaster base and insulating blanket thickness throughout. Simplified design and installation in single-layer, double-layer and unbalanced construction are available to meet requirements for party wall, corridor and divider partitions.

2. Metal Furring Channel—With Foil-Back IMPERIAL Plaster Base screwed to USG Metal Furring Channels erected 16" o.c. (continued on page 2)



party wall partition



suspended ceiling

description (continued from page 1)

direct to masonry or furred with brackets and $\frac{3}{4}$ " channels, this construction provides an excellent vapor barrier and offers significant insulating value as exterior wall furring (see page 8). A 3-hour fire-rated ceiling construction including beam protection is available with $\frac{5}{8}$ " IMPERIAL FIRECODE "C" Base screw-attached to furred or suspended USG Metal Furring Channels (see page 8). Z-Furring Channels are also used to mechanically attach THERMAFIBER Z-Furring Insulating Blankets to exterior walls. With $\frac{1}{2}$ " or $\frac{5}{8}$ " IMPERIAL Plaster Base screw-attached to these channels, the assembly provides a fully insulated wall at a cost competitive with many non-insulated furred walls.

3. USG Steel Box-T or H-Studs—IMPERIAL Plaster Base applied in one or two layers with gypsum coreboard and Steel Box-T or H-Studs provides systems with up to 3-hour fire ratings. These are ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see System Folder SA-922 for Shaft Wall applications.)

4. Wood Framing—IMPERIAL Base may be nail or screw-attached to wood framing where 1 or 2-hour fire protection is needed. With base screw-attached to resilient channels, sound ratings up to 53 STC are obtained. For details refer to U.S.G. System Folder SA-913, IMPERIAL Plaster and Wood Framing.

5. PYROBAR Partition Tile—With IMPERIAL Base and Plaster applied, 4-hour column fire protection is available (see separate PYROBAR Tile System Folder SA-405).

function and utility

IMPERIAL Plaster Systems are designed for interior partitions and ceilings, exterior wall furring or wherever conventional plaster or drywall systems are used. The integrated components offer beautiful, hard surfaces ready for next-day decoration. IMPERIAL Plaster provides 3,000 psi compressive strength.

Durability—The high-strength, abrasion- and crack-resistant features of IMPERIAL Plaster offer the durability needed in high-traffic areas, and obtainable with few other materials.

Fire Resistance—Noncombustible components provide systems with fire-resistance ratings up to 3 hours (see table, page 1).

Sound Control—The systems offer sound isolation up to 53 STC; ideal for party walls.

Versatility—Adaptable to most dimensions or modules in virtually all types of buildings, these systems meet all normal design and job conditions.

Light Weight—The completed partition systems weigh appreciably less than masonry assemblies of the same thickness.

Economy—Simple, inexpensive components erect quickly at a lower cost than conventional plaster systems. Finish is rapidly applied by machine or hand application.

limitations

1. Non-load bearing.
2. These assemblies should not be used where exposed to abnormal moisture or excessive humidity or temperature.
3. Maximum frame spacing and limiting heights should not be exceeded (see tables below).

maximum frame spacing

lath and plaster assembly	steel studs or furring channels
$\frac{5}{8}$ " IMPERIAL Plaster Base one layer, 1-coat plaster	16"
one layer, 2-coat plaster	16" or 24" (1)
two layer, 1 & 2-coat plaster	24"
$\frac{5}{8}$ " IMPERIAL Plaster Base one layer, 1-coat plaster	16" or 24" (1)
one layer, 2-coat plaster	24"
two layer, 1 & 2-coat plaster	24"

(1) 24" spacing requires joint treatment with DURABOND Compound and PERF-A-TAPE Reinforcing.

limiting height—steel stud assemblies (1)

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
USG Steel Studs (Standard)						
158ST5	$1\frac{5}{8}$ "	16"	1/240 1/360	9'9" d 8'6" d	11'3" f 11'3" f	8'9" d 7'6" d
		24"	1/240 1/360	8'6" d 7'6" d	9'3" f 9'3" f	7'6" d —
20ST5	2"	16"	1/240 1/360	11'0" d 9'9" d	12'9" f 12'9" f	10'0" d 8'9" d
		24"	1/240 1/360	9'9" d 8'6" d	10'6" f 10'6" f	8'9" d 7'6" d
212ST5	$2\frac{1}{2}$ "	16"	1/240 1/360	12'9" d 11'0" d	14'9" f 14'9" f	11'6" d 10'0" d
		24"	1/240 1/360	11'0" d 9'9" d	12'0" f 12'0" f	10'0" d 8'9" d
30ST5	3"	16"	1/240 1/360	14'3" d 12'6" d	16'9" f 16'6" d	13'0" d 11'6" d
		24"	1/240 1/360	12'6" d 11'0" d	13'9" f 13'9" d	11'3" d 10'0" d
358ST5	$3\frac{5}{8}$ "	16"	1/240 1/360	16'3" d 14'3" d	19'0" f 18'3" d	15'0" d 13'0" d
		24"	1/240 1/360	14'3" d 12'6" d	15'6" f 15'6" f	12'6" f 11'6" d
40ST5	4"	16"	1/240 1/360	17'3" d 15'3" d	20'3" f 19'3" d	16'0" d 14'0" d
		24"	1/240 1/360	15'3" d 13'3" d	16'6" f 16'6" f	13'3" f 12'3" d
60ST5	6"	16"	1/240 1/360	19'3" d 16'9" d	19'9" f 19'9" f	15'0" f 14'3" d
		24"	1/240 1/360	16'0" f 14'9" d	16'0" f 16'0" f	12'3" f 12'3" d

20-ga. USG Steel Studs

212ST10	$2\frac{1}{2}$ "	16"	1/240 1/360	14'6" d 12'6" d	18'3" d 16'0" d	13'9" d 12'0" d
		24"	1/240 1/360	12'6" d 11'0" d	16'0" d 14'0" d	12'0" d 10'6" d
358ST10	$3\frac{5}{8}$ "	16"	1/240 1/360	18'9" d 16'3" d	22'6" d 19'6" d	18'0" d 15'9" d
		24"	1/240 1/360	16'3" d 14'3" d	19'6" d 17'0" d	15'9" d 13'9" d
40ST10	4"	16"	1/240 1/360	20'0" d 17'6" d	23'9" d 20'9" d	19'3" d 16'9" d
		24"	1/240 1/360	17'6" d 15'3" d	20'9" d 18'3" d	16'9" d 14'9" d
60ST10	6"	16"	1/240 1/360	20'0" c 20'0" c	28'3" d 24'9" d	20'0" c 18'9" d
		24"	1/240 1/360	20'0" c 17'9" d	24'9" d 21'6" d	18'9" d 16'3" d

(1) Limiting height for $\frac{1}{2}$ " or $\frac{5}{8}$ " thick base and 5 psf uniform load perpendicular to partition or furring. Limiting criteria: d—deflection, f—bending stress, c—practical limitation. Consult local code authority for limiting criteria.

limiting height—chase wall partitions (1)

stud style	stud width	stud spacing	allow. defl.	one layer	two layers
158ST5	$1\frac{5}{8}$ "	16"	1/240 1/360	13'3" d 11'6" d	15'9" f 15'9" f
		24"	1/240 1/360	11'6" d 10'3" d	13'0" f 13'0" d
212ST10	$2\frac{1}{2}$ "	16"	1/240 1/360	19'6" d 17'0" d	25'0" d 21'9" d
		24"	1/240 1/360	17'0" d 14'9" d	21'9" d 19'0" d

(1) Limiting height for $\frac{1}{2}$ " or $\frac{5}{8}$ " thick base and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

technical data/components/details

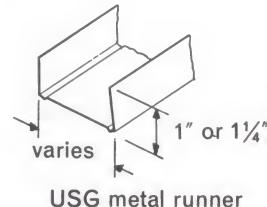
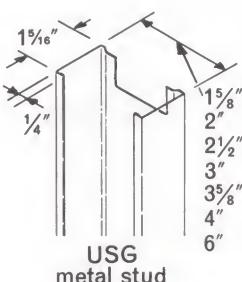
sound transmission loss—db

test no.	method	band center frequency—Hz																				STC	
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800	3150	4000	
TL-63-177	Lab	37	—	39	—	42	—	47	—	47	—	47	—	51	—	50	—	48	—	53	—	57	50
CK-654-66	Lab	31	40	—	44	46	48	—	52	52	53	—	53	54	53	—	53	54	55	—	57	59	53
KSO-1090072-a	Field	26	29	—	37	39	45	—	48	48	49	—	52	54	55	—	52	52	53	—	55	56	49
USG-127FT-G&H	Lab	29	—	43	—	47	—	50	—	55	—	54	—	56	—	58	—	52	—	57	—	57	52
CK-664-1	Lab	27	32	—	39	40	42	—	44	44	46	—	47	45	45	—	46	44	44	—	46	49	45

limiting height—"series 4" partitions (1)

stud spacing	allow. defl.	one layer, 30ST5 studs	unbalanced, 212ST5 studs	two layers, 20ST5 studs
16"	1/240 1/360	14'3" d 12'6" d	14'9" d 12'9" d	12'9" f 12'9" f
24"	1/240 1/360	12'6" d 11'0" d	12'0" f 11'3" d	10'6" f 10'6" f

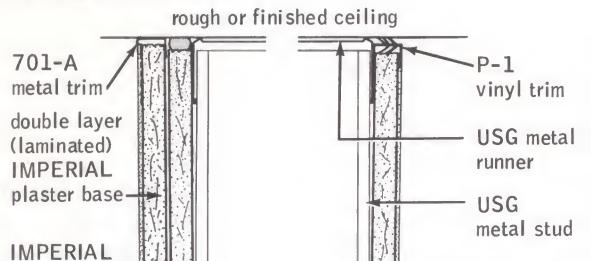
(1) Limiting height for $\frac{1}{2}$ " thick base and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.



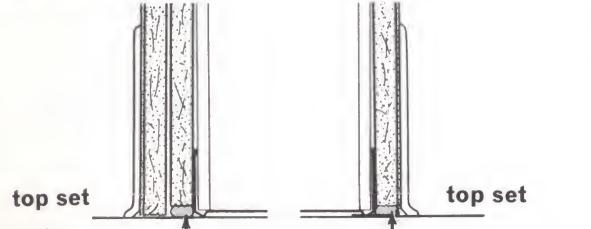
see "plaster bases" product catalog for full description on accessories & sizes

metal stud partitions

ceiling attachment



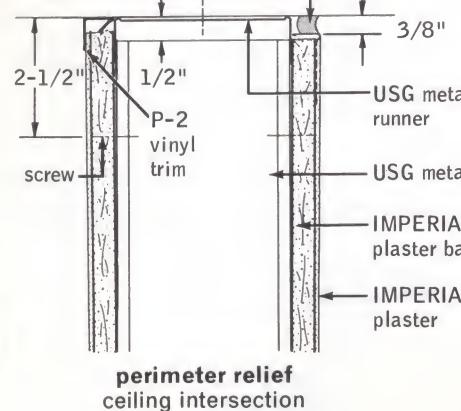
floor attachment



top set

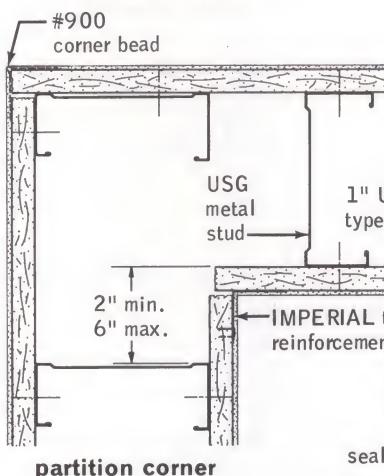
sealant--see notes to architect

sealant--see notes to architect

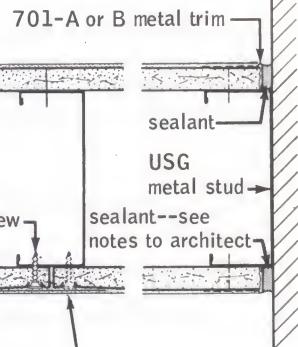


perimeter relief
ceiling intersection

wall plan sections



partition corner



intersection

sealant--see notes to architect

fin. clg. line

701-A metal trim

1/2" IMPERIAL

plaster base

attached to studs

with type S screws

chalkboard paint

on 1/16" to 1/8"

IMPERIAL plaster

chalktrough

secured to

metal stud

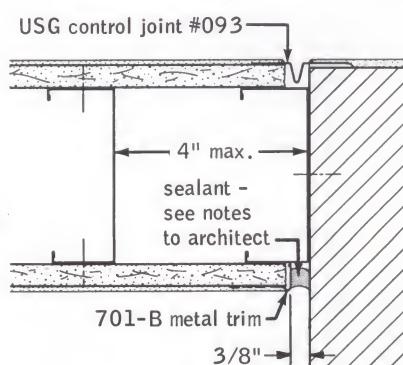
with type S

screws

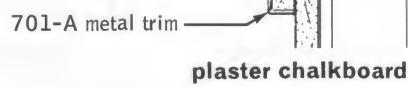
USG metal

studs 16" o.c.

701-A metal trim



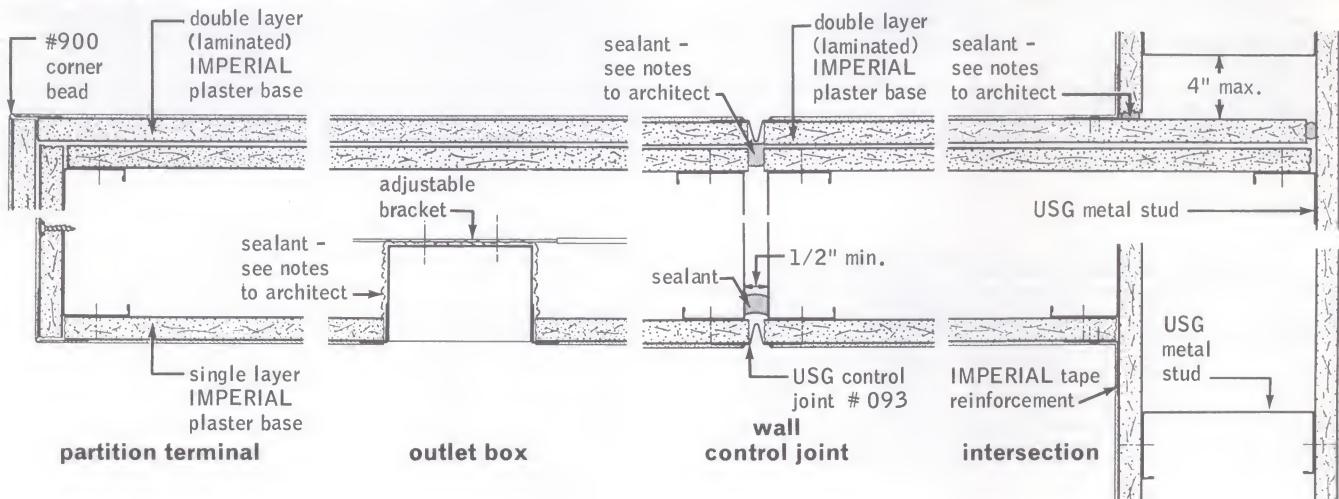
perimeter relief
and control joint
wall or column intersection



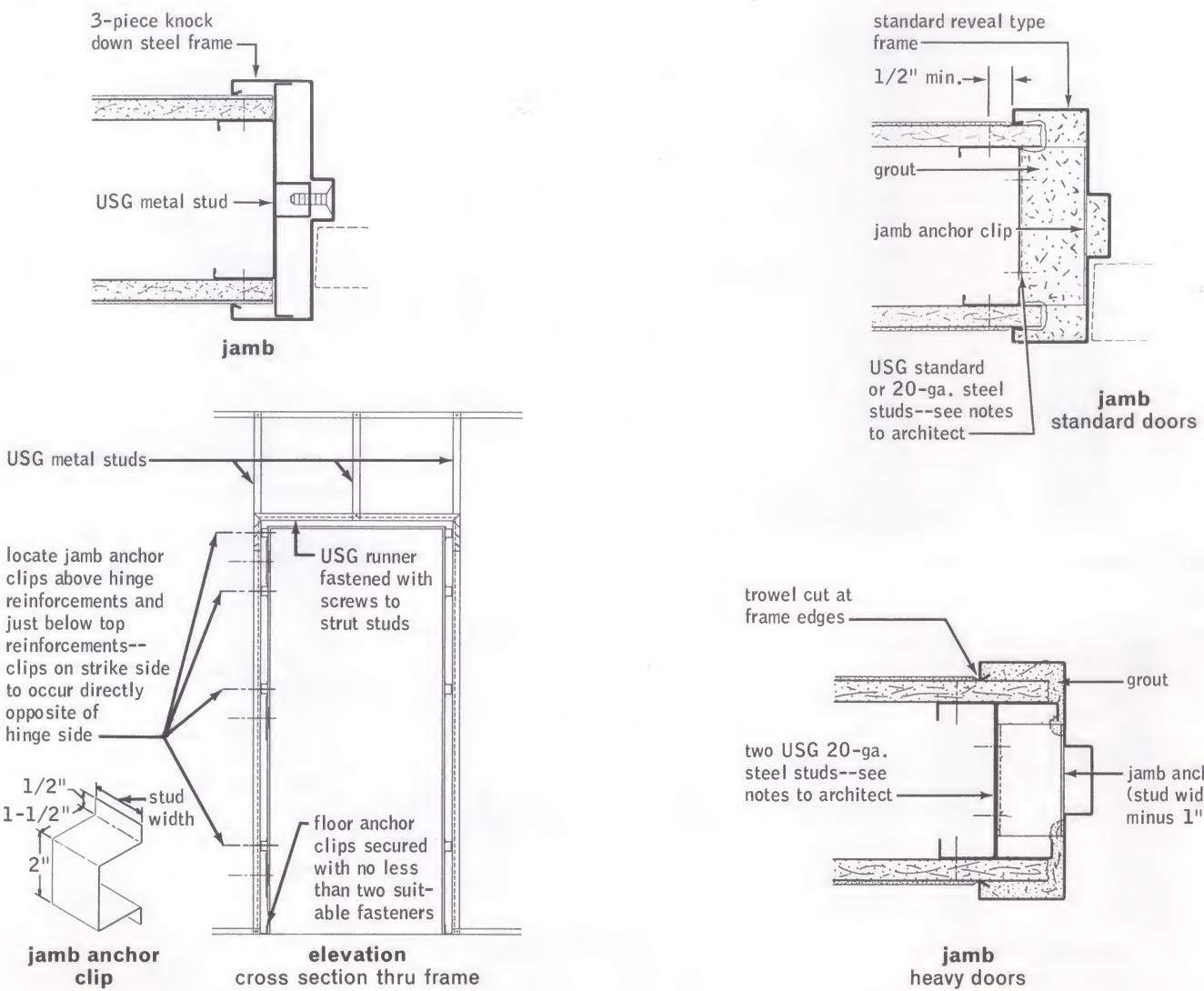
details/metal stud assembly

scale: 3" = 1'-0"

wall plan sections

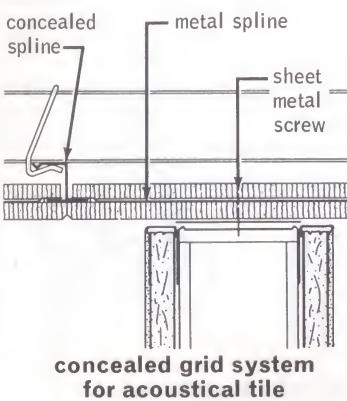
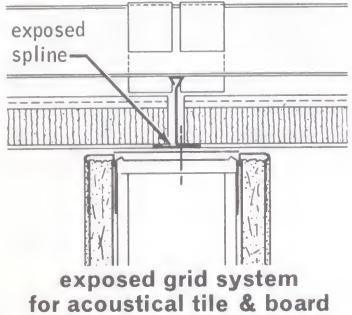
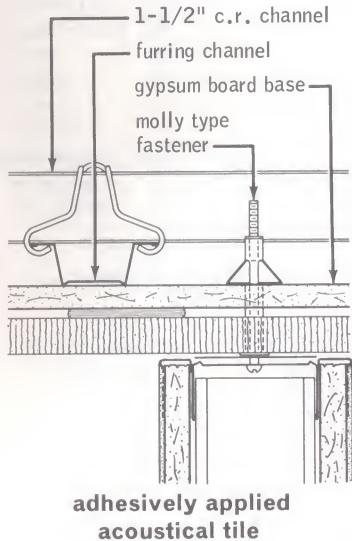


door frames



details/metal stud assembly

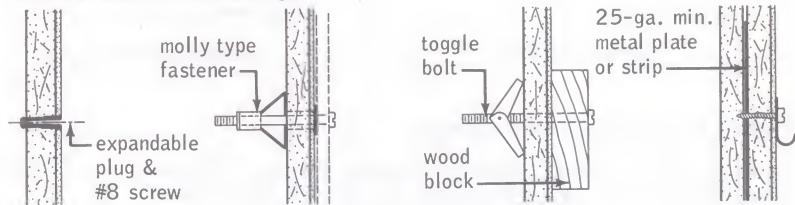
attachment of partition to ceiling



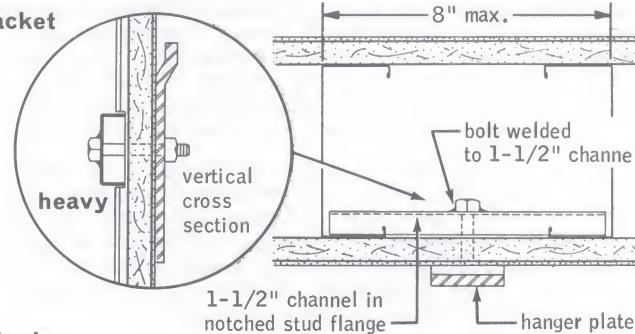
fixture attachment load table

type fastener or attachment		allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
fiber or plastic plug	#6 screw	10	40
	#8 screw	15	40
	#10 screw	20	50
	#12 screw	30	60
	#14 screw	30	75
toggle or molly	1/8" bolt	20	40
	3/16" bolt	30	50
	1/4" bolt	40	60
no. 8 sheet metal screw into 25-ga. metal sheet		50	100
type fastener or attachment		allowable static load—lbs.	allowable impact load—lbs.
plumbers bracket attached with 5/16" bolts and 1 1/2" channels		350	75
type fastener or attachment		uniform load—lbs. per bracket	uniform load—lbs. per lin. ft.
angle brackets (24" o.c.)		100	50
slotted standards (24" o.c.) light (.063" thick) medium (.082" thick) heavy (.094" thick)		40	20
		100	50
		150	75

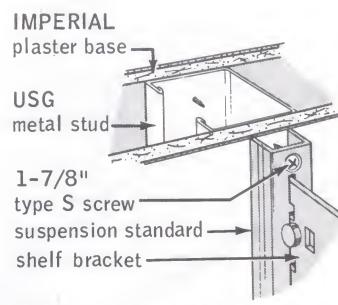
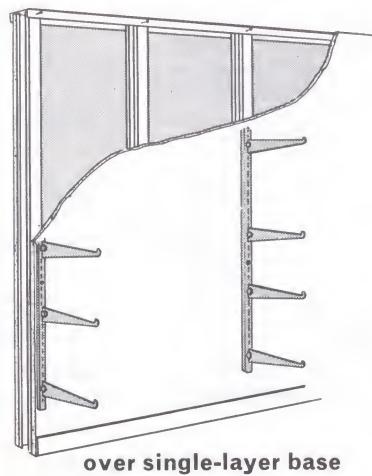
fixture attachments—light



plumbers bracket



slotted standards



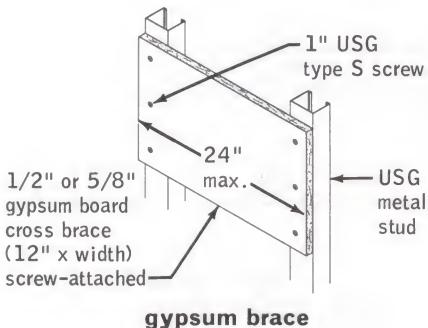
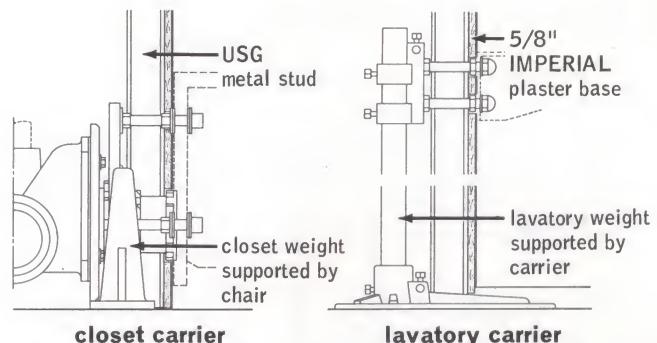
cross section

details

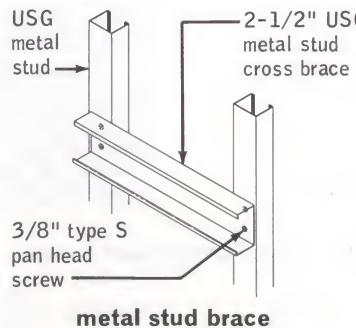
chase walls

Chase walls, as vertical shafts encasing the usual plumbing supply and wastelines, vent ducts and electrical conduits, require more free space than can be provided within the usual partition assembly.

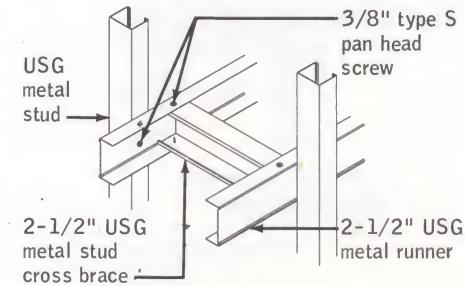
The metal stud chase wall may be formed of two USG Steel Studs bracketed together with 12" x chase width braces of $\frac{1}{2}$ " or $\frac{5}{8}$ " IMPERIAL Plaster Base. As an alternate, 2 $\frac{1}{2}$ " metal stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, metal stud cross braces 24" o.c. are securely anchored to a continuous horizontal 2 $\frac{1}{2}$ " runner screw-attached to chase wall studs within the cavity. Limiting height for this chase wall is shown on page 2; vertical brace spacing 48" o.c. max.



gypsum brace



metal stud brace



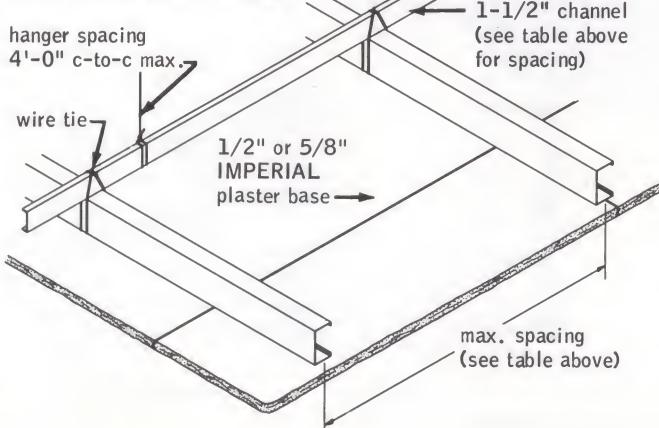
metal stud & runner brace

furred or suspended ceilings

IMPERIAL Plaster Ceiling Systems consist of IMPERIAL Plaster Base, FIRECODE "C" or regular, screw-attached to USG Metal Furring Channels. These channels are firmly clipped or wire-tied to suspended main runner channels or wire-tied to main support members. USG Brand Screws Type S are used to attach the plaster base to the furring channels. For long span requirements resulting from the location of large ducts or pipes in the ceiling space, the USG Steel Stud may be used as a ceiling furring member in this construction (see table at right).

These noncombustible assemblies are designed for interior furred or suspended ceilings or caged beam fireproofing. They serve to conceal and protect structural and mechanical elements with a lightweight fire-resistant ceiling that is highly light reflective when unfinished or is easily decorated and maintained. Perfectly integrated components provide beautiful, hard surfaces ready for next-day decoration.

USG metal stud furring

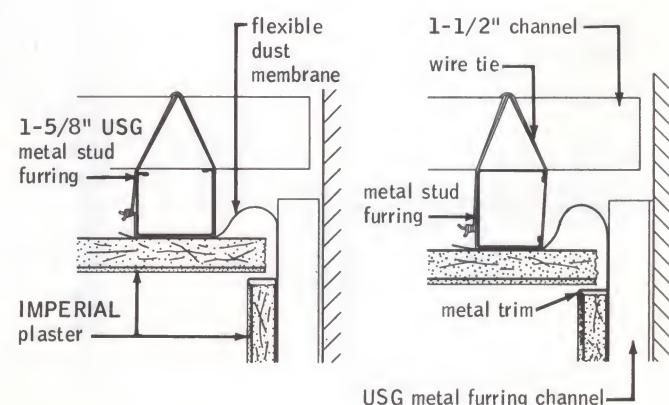


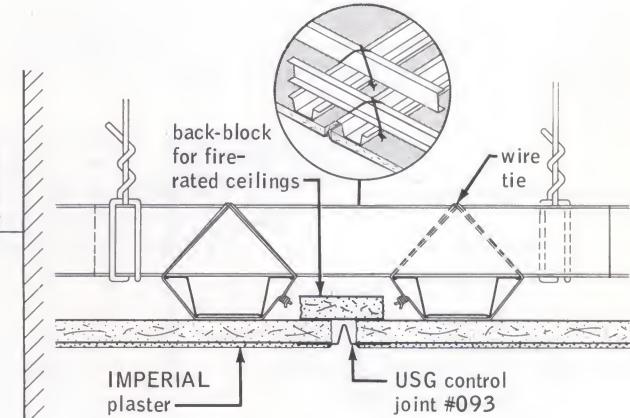
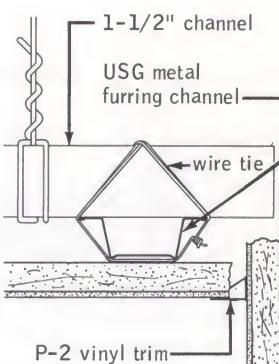
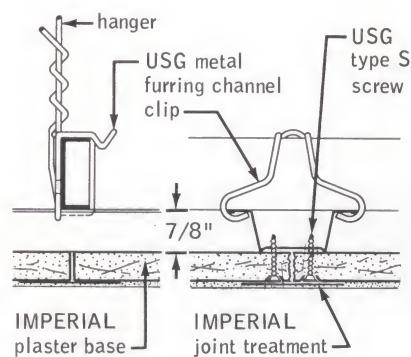
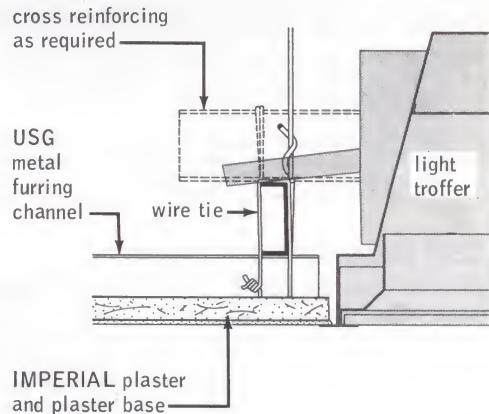
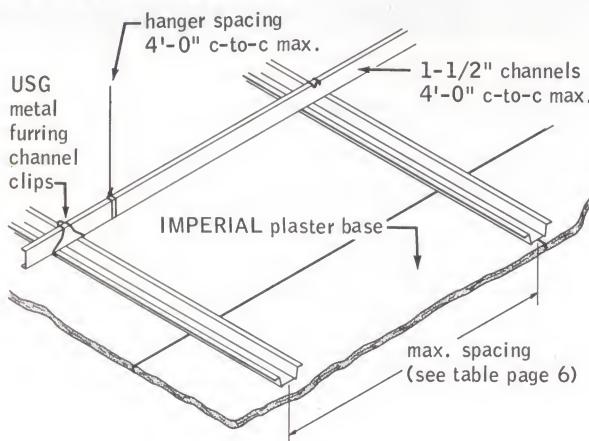
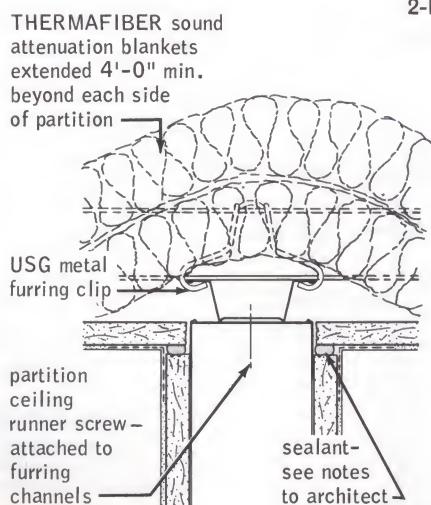
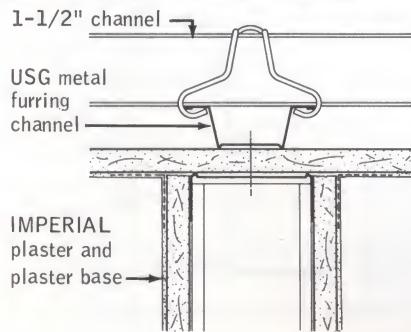
component spacing

type furring member	ceiling systems—component spacing			
	furring member c. to c. spacing		main support member c. to c. spacing	
	for plaster base thickness of:			
USG Metal Furring Channel	$\frac{1}{2}$ " 16"	$\frac{5}{8}$ " 16" [†]	$\frac{1}{2}$ " 4'-0" ^{††}	$\frac{5}{8}$ " 4'-0" ^{††}
USG Metal Stud	1 $\frac{1}{2}$ " erected with both flanges up and against main support member	16"	16" [†]	5'-0" 5'-0"
	2 $\frac{1}{2}$ "	16"	16" [†]	10'-3" 10'-3"
	3 $\frac{3}{8}$ "	16"	16" [†]	13'-6" 13'-6"

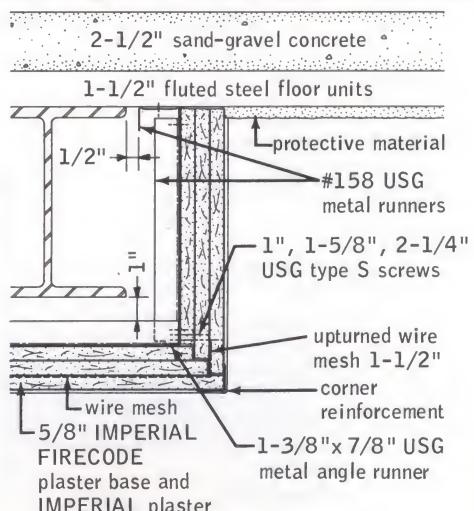
[†]24" spacing may be used with 2-coat plastering.

^{††}2'-0" spacing for 2-hr. UL Des G515.



USG metal furring channel**partition attachment at ceiling****continuous ceiling****interrupted ceiling**

beam protection (beam only)
3-hr. UL design no. N505 (restrained assembly)
2-hr. UL design no. N505 (unrestrained assembly)



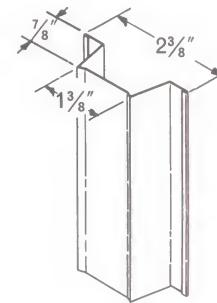
exterior wall furring/metal channels

description	comments
1" THERMAFIBER Z-Furring Blankets—USG Z-Furring Channels appl vert 24" o.c.— $\frac{1}{2}$ " IMPERIAL plaster base screw-attached to channels, $\frac{1}{16}$ " IMPERIAL veneer plaster finish	Surface membrane isolated from masonry
USG Metal Furring Channels 16" o.c., $\frac{1}{2}$ " Foil-Back IMPERIAL plaster base screw-attached to channels, $\frac{1}{16}$ " IMPERIAL veneer plaster finish	May be attached direct or additionally furred out on $\frac{3}{4}$ " horizontal cold-rolled channels; good vapor barrier

USG Metal Furring Channels

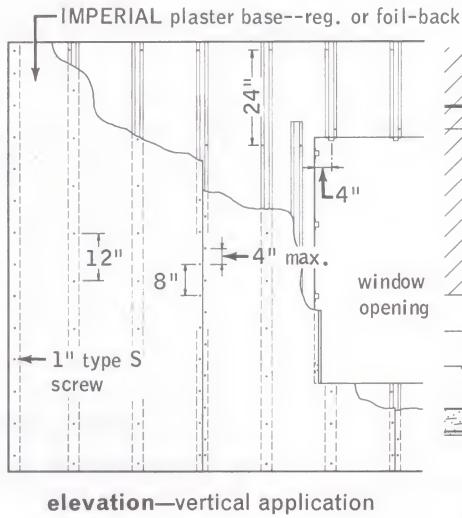
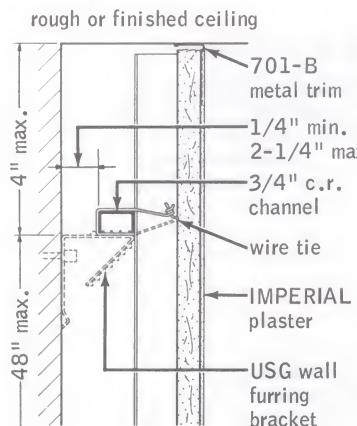
Exterior walls are readily furred using IMPERIAL Plaster Base screw-attached to USG Metal Furring Channels erected vertically 16" o.c. Channels are either fastened directly to masonry or furred using USG Adjustable Wall Furring Brackets and $\frac{3}{4}$ " channels to provide additional space for pipes, conduits or ducts. With the Adjustable Wall Furring Bracket, the limiting height is 12'.

In this assembly, Foil-Back IMPERIAL Plaster Base has thermal resistance (R) values of 3.93 for $\frac{1}{2}$ " thickness and 4.04 for $\frac{5}{8}$ " thickness. Resistances are based on vertical application, inside still air film, board thickness with one reflective surface facing a $\frac{3}{4}$ " min. air space.

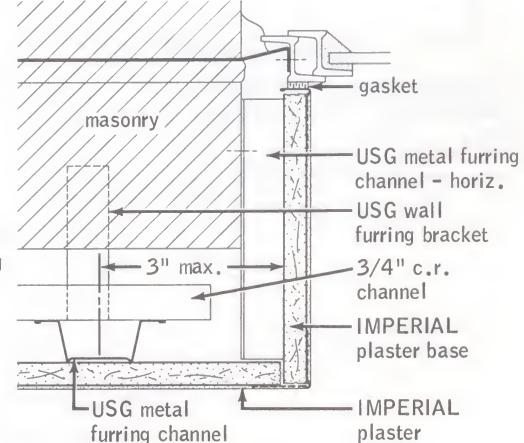


USG metal furring channel

ceiling attachment

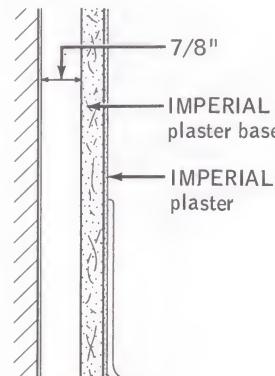
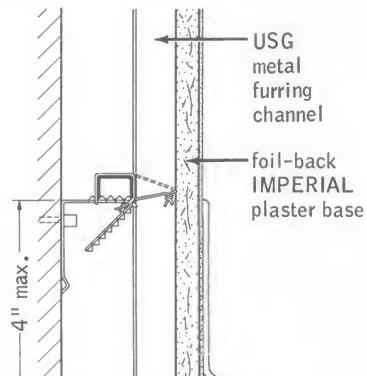


elevation—vertical application

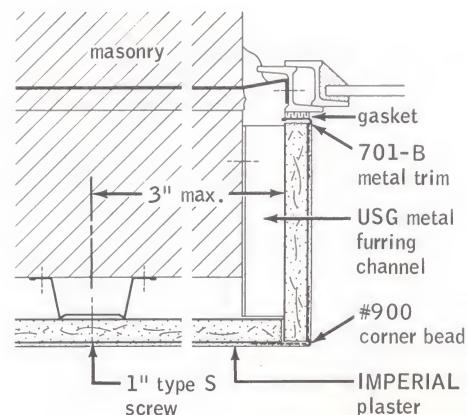


metal window jamb

floor attachment



top set



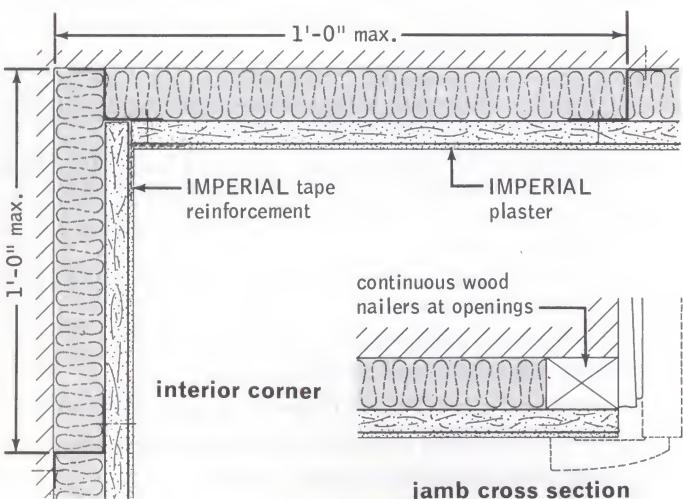
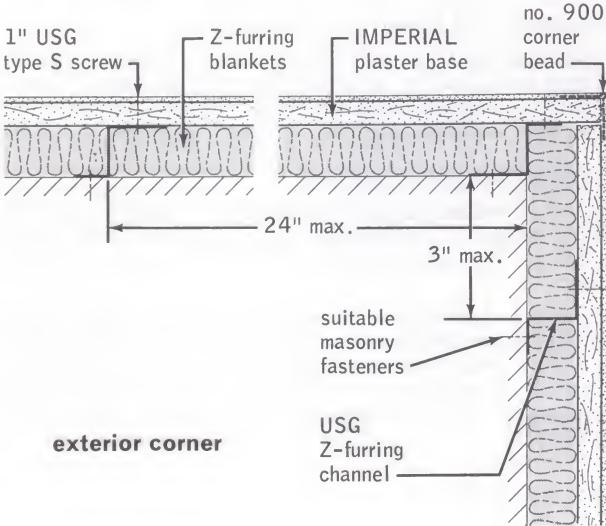
metal window jamb

USG Z-Furring Channels

In this assembly, USG Z-Furring Channels are used to mechanically attach THERMAFIBER Z-Furring Blankets to exterior walls. IMPERIAL Plaster Base is screw-attached to the channels and finished with a thin veneer of high-strength IMPERIAL Plaster. USG Z-Furring Channels, suitable for $\frac{3}{4}$ " or 1" thick insulation, are formed from hot-dipped galvanized steel for added corrosion resistance.

This system provides a self-furred solid backup for IMPERIAL Base. The surface membrane is isolated to a great degree from the exterior wall. Fire-resistant THERMAFIBER Z-Furring Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid spun mineral-fiber mat, 1" thick, that meet the requirements for Class A construction. Thermal insulation values (U-factors) for various assemblies are shown at right. IMPERIAL Plaster, applied over the plaster base in one or two coats, offers a strong abrasion-resistant interior surface.

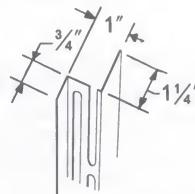
wall plan sections



design heat transmission coefficients (U-factors)

wall construction	nom. wall thickn.	unfin. wall	furred wall† (no insul.)	wall insulated with 1" THERMAFIBER Z-Furring Blankets
4" face brick 8" block	12"	.42	.26	.14
4" face brick 4" com. brick	8"	.48	.30	.15
SCR brick	6"	.67	.35	.14
poured conc. 140 lb./cu. ft.	8"	.70	.37	.14
conc. block sand & gravel aggregate	8" 12"	.55 .49	.33 .31	.14 .13

†Interior wall finish: $\frac{1}{2}$ " IMPERIAL Base and Plaster. All U-factors expressed in Btu/sq. ft./hr./°F, 75°F mean insulating temperature.



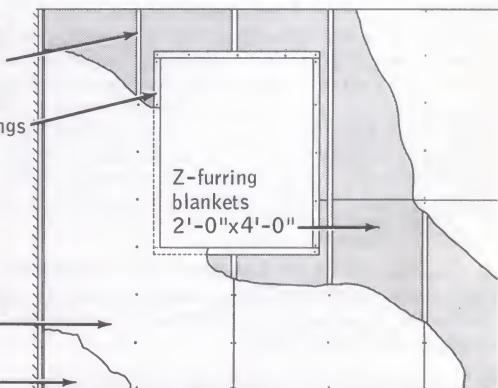
USG Z-furring channel

USG Z-furring channels spaced at 24" c to c

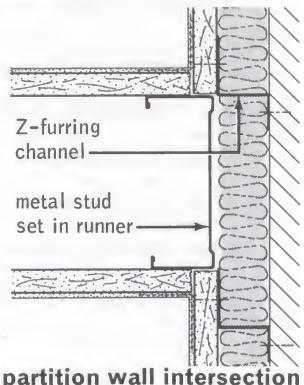
continuous wood nailers at openings

1/2" or 5/8" IMPERIAL plaster base applied vertical or horizontal

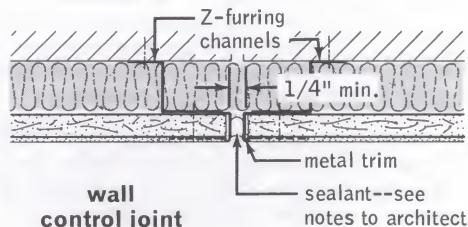
IMPERIAL plaster



wall elevation



partition wall intersection



wall control joint

sealant--see notes to architect

specifications

notes to architect

1. Metal door and borrowed-light frames should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 4). Stud reinforcing described below is screw-attached to jamb anchor clips. Three-piece frames may also be used with these partitions.

For hollow-core doors up to 2'8" wide, standard steel studs may be used for reinforcing. For solid-core doors and hollow-core doors 2'8" to 4'0" wide, reinforcing should be 20-ga. steel studs. For doors over 4'0" wide, double doors and extra heavy doors such as used for X-ray rooms, two 20-ga. studs placed back-to-back should be used.

For added door frame restraint, spot-grouting at the jamb anchor clip is recommended. Spot-grouting is required for solid-core doors and doors over 2'8" wide. Apply DURABOND or USG Ready-To-Use Joint Compound just before inserting plaster base into frame; do not terminate base against trim return. Plaster should be grooved at frame.

2. Plaster base surfaces should be isolated with control joints or other means where: (a) partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; (b) a ceiling abuts a structural element; dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimensions exceed 50' in either direction; (f) the area within separate ceiling sections exceed 900 sq. ft.; (g) expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

3. Penetrations of the lath-and-plaster diaphragm, such as door frames and borrowed-light openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.

4. Additional chases can be provided in metal studs (except in fire-rated construction) by cutting round holes up to $\frac{3}{4}$ of stud width, spaced 12" apart.

5. Shallow electrical outlet boxes are recommended when rigid insulation less than 1½" thick is used.

6. **Fixture Attachment**—Lightweight fixtures and trim should be installed by drilling and inserting expandable anchors in plaster base for attachment screws. Wood or metal mounting strips for cabinets and shelving should be attached with toggle bolts through the plaster base near studs.

7. **Ceramic Tile**—IMPERIAL Plaster Base is not recommended as a base for the adhesive application of ceramic, metal and plastic tile. SHEETROCK W/R Gypsum Panels are recommended for this use (see U.S.G. Product Folder SA-927 in this series on Gypsum Panels).

8. Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Door and borrowed-light openings are not recommended in sound control partitions.

9. All lime-putty finishes applied over IMPERIAL Basecoat Plaster must be properly sealed before decorating. Unsealed IMPERIAL Finish Plaster may be painted the day after application if a breather-type paint is used.

10. Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

11. During periods of low outside temperature, condensation may form on exterior walls, collecting airborne dirt to produce photographing or shadowing over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.

12. See U.S.G. product folders in this series: Gypsum Plasters Folder SA-918 for plaster specifications; Plaster Bases & Accessories Folder SA-917 for general lathing specifications; Paint Products Folder SA-933 for paint specifications.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before plaster base installation. Ventilation shall be provided to carry off excess moisture.

b. When low humidity, high temperatures and rapid drying conditions exist during plaster base and plaster application, DURABOND Joint Compound and PER-A-TAPE Reinforcement shall be used on all joints and internal corners and allowed to set and dry thoroughly before plaster application.

Part 2: products

2.1 materials

- a. IMPERIAL Plaster Base ($\frac{1}{2}$) ($\frac{5}{8}$) thick, 48" wide, square edge, (Regular) (Foil-Back) (FIRECODE) (FIRECODE "C"), lengths as required.
- b. Laminating Adhesive—DURABOND Joint Compound-Taping or 90 mixed in accordance with manufacturer's directions (for double-layer application).
- c. Fasteners— $\frac{3}{8}$ ", $\frac{7}{8}$ ", 1", $1\frac{1}{4}$ ", $1\frac{5}{16}$ ", $1\frac{3}{8}$ " and $2\frac{1}{4}$ " USG Brand Screws Type S; $1\frac{1}{2}$ " USG Brand Screws Type G.
- d. USG Steel Studs—($1\frac{3}{8}$) (2") ($2\frac{1}{2}$) (3") (3 $\frac{3}{8}$) (4") (6"), lengths as required.
- e. USG Steel Runner—($1\frac{3}{8}$) (2") ($2\frac{1}{2}$) (3") (3 $\frac{3}{8}$) (4") (6") for USG Steel Studs.
- f. USG Metal Angle Runner, $1\frac{3}{8}$ " x $\frac{7}{8}$ " x 24-ga.
- g. USG Metal Furring Channel and Clips.
- h. IMPERIAL Tape—(Type P) (Type S) for joint reinforcement.
- i. USG Cold-Rolled Channels ($\frac{3}{4}$) (1 $\frac{1}{2}$) (2").
- j. USG Adjustable Wall Furring Bracket.

- k. Accessories—USG #900 Corner Bead, (701-A) (701-B) Metal Trim, (P-1) (P-2) Vinyl Trim, Control Joint #093, 16-ga. Tie Wire.
- l. THERMAFIBER (Sound Attenuation) (Z-Furring) Blankets.
- m. USG Z-Furring Channel.
- n. USG Acoustical Sealant.
- o. DURABOND Joint Compound and PERF-A-TAPE Reinforcement.

Part 3: execution

3.1 metal stud partition system erection

Attach metal runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle or molly bolts spaced 16" o.c.

Position studs vertically, engaging floor and ceiling runners, and spaced (16") (24") o.c. When necessary, splice studs with 8" nested lap and one positive attachment per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly to exterior walls and possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs adjacent to door and window frames, partition intersections, and corners to ceiling and floor runner flanges with USG Metal Lock Fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment (not required for frames with structural bar struts). Over metal door and borrowed-light frames, place a cut-to-length section of runner track, with a web-flange bend at each end, horizontally and secure with one positive attachment per flange. Position a cut-to-length stud (extending to the ceiling runner) at the location of vertical joints over door frame header.

3.2 single layer plaster base erection

Apply plaster base (vertically) (horizontally). Position all edges over stud flanges for vertical application; all ends over stud flanges for horizontal application. To maintain a true surface plane, arrange direction of application so leading edge of base is attached first to open end of stud flange. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

For vertical application of base, space screws 12" o.c. in field of base and 8" o.c. staggered along vertical abutting edges. For horizontal base application, space screws 12" o.c. in field and along abutting end joints.

3.3 double layer plaster base erection

For screw attachment, space screws 16" o.c. for both layers. Apply both layers of plaster base vertically with joints in face layer offset from base layer joints. For $\frac{5}{8}$ " base, use 1" screws for base layer and $1\frac{1}{8}$ " screws for face layer. For $\frac{1}{2}$ " base, use $\frac{7}{8}$ " screws for base layer and $1\frac{5}{16}$ " screws for face layer.

In double-layer laminated construction, attach base layer with 1" type S screws spaced 8" o.c. at joint edges and 12" o.c. in field. Apply face layer vertically with DURABOND Joint Compound-Taping or 90 spread on back side, joints staggered approx. 12" and fastened to base layer with $1\frac{1}{2}$ " type G screws. Drive screws approx. 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 3" from vertical edges.

3.4 chase wall erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub

nails or power-driven anchors 24" o.c., to suspended ceilings with toggle or molly bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position metal studs vertically in runners, (16") (24") o.c., with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs adjacent to door and window frames, partition intersections and corners to floor and ceiling runner flanges with USG Metal Lock Fastener tool.

Cut cross bracing to be placed between rows of studs from plaster base, 12" high by wall width. Space braces 48" o.c. vertically and attach to stud webs with six type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side. Attach single-layer or base-layer plaster base with ($\frac{7}{8}$) (1") type S screws spaced 12" o.c. in field and 8" o.c. staggered at vertical joints.

Bracing of $2\frac{1}{2}$ " metal studs may be used in place of gypsum braces. Anchor web at each end of metal brace with two $\frac{3}{8}$ " pan head screws. When chase wall studs are not opposite, install metal stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal $2\frac{1}{2}$ " runner screw-attached to chase wall studs within the cavity.

3.5 ceiling grillage erection

Space 8-ga. hanger wires 48" o.c. along carrying channels and within 6" of ends of carrying-channel runs. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install $1\frac{1}{2}$ " carrying channels (48") (24" for fire-rated construction) o.c., and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 16-ga. tie wire.

Erect metal furring channels at right angles to $1\frac{1}{2}$ " carrying channels or main support members. Space furring (16") (24") o.c. and within 6" of walls. Provide 1" clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double-strand 16-ga. tie wire. At splices, nest furring channels at least 8" and securely wire-tie each end with double-strand 16-ga. tie wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.6 ceiling panel installation

Apply plaster base of maximum practical length face down with long dimension at right angles to furring channels. Position end joints over channel web and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten base to channels with 1" type S screws spaced 12" o.c. in field of base and along abutting ends and edges.

3.7 caged beam fireproofing

Position ceiling runners at least $\frac{1}{2}$ " from and parallel to beam and fasten to floor units with $\frac{1}{2}$ " type S-12 pan head screws spaced 12" o.c. Fabricate hanger brackets from $1\frac{1}{8}$ " metal runners allowing 1" clearance at bottom of beam. Space brackets 24" o.c. along beam and attach to ceiling runners with $\frac{1}{2}$ " type S-12 screws. Install lower corner runners parallel to beam and fasten to brackets with $\frac{1}{2}$ " type S-12 screws.

Screw-attach three layers of $\frac{5}{8}$ " IMPERIAL FIRECODE Plaster Base to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in

each layer. Attach panels to channel brackets with 1" type S screws 16" o.c. for base layer, 1½" type S screws 12" o.c. for middle layer and 2¼" type S screws 8" o.c. for face layer. Install wire mesh over bottom middle layer panel, extend 1½" up each side and fasten with 1½" screws used to fasten panels.

3.8 wall furring channel attachment—direct

Attach metal furring channels vertically, spaced (16") (24") o.c., to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24" o.c. on opposite flanges. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

3.9 wall furring channel attachment—bracketed

Attach adjustable wall furring brackets with serrated edges up, 36" o.c. horizontally, 48" o.c. vertically, within 4" of columns or other abutting construction, within 6" of floor and ceiling, and as required above and below windows, with (2" cut nail in mortar joints of brick, clay tile or concrete block, or in field of lightweight aggregate blocks) (½" concrete stub nails, power-driven nails or other suitable fasteners in poured concrete). Place fastener in top hole of bracket. Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with double-strand 16-ga. or triple-strand 18-ga. wire, bend down excess bracket length. Erect metal furring channel vertically, spaced (16") (24") o.c. and tie with double-strand 16-ga. or triple-strand 18-ga. wire at each channel junction.

At outside corner, attach plaster base to short horizontal mitered furring channels or to a vertical metal stud.

3.10 Z-furring channel attachment

Erect mineral fiber insulation vertically and hold in place with Z-furring channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner; start from this furring channel with a 3" strip of insulation followed by furring channel in the normal manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold insulation in place until plaster base is installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel.

Apply plaster base (vertically) (horizontally) with vertical joints occurring over channels. Attach plaster base with 1" type S screws spaced 12" o.c. in field and at edges, and with

1¼" type S screws spaced 12" o.c. at exterior corners. Use DURABOND Compound and PER-A-TAPE Reinforcement on all joints, interior corners, trim and corner beads and allow to set and dry thoroughly before finish plaster application.

3.11 accessory application

When low humidity, high temperatures and rapid drying conditions exist, use DURABOND Joint System on all joints and internal corners and allow to set and dry thoroughly before applying finish plaster.

a. **Reinforcing Tape**—Apply over full length of all plaster base joints; do not overlap at intersections.

Type P Tape—Firmly press along entire length to insure firm wrinkle-free attachment.

Type S Tape—Apply with spring-driven stapler using ¾" staples. Use two staples at each end of tape and stagger intermediate staples 24" along length of tape. At wall-ceiling intersections and interior corners, staple tape 24" o.c. along ceiling edge or on one edge only. For fire-rated assemblies, staple tape 8" o.c.

b. **Laminating Adhesive**—Spread to provide ½" adhesive beads 4½" o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips of four ½" beads 1½" to 2" o.c. Space strips 24" o.c.

c. **Corner Bead**—Reinforce all vertical and horizontal exteriors corners with corner bead fastened with ¾" rosin-coated staple 12" o.c. on both flanges along entire length of bead.

d. **Casing Bead**—Where wall or partition terminates against masonry or other dissimilar material, apply 701-B metal trim over plaster base and fasten with ¾" rosin-coated staples 12" o.c. Where exposed casing is required, apply 701-A in same manner.

e. **Screws**—Power-drive and set so screwhead is flush with surface of plaster base without tearing through face paper.

f. **Control Joints**—Break plaster base behind joint and back by double studs or furring channels. Attach control joint to plaster base with ¾" rosin-coated staples spaced 12" o.c. on both flanges along entire joint length.

g. **P-1 Vinyl Trim**—Slip trim over plaster base with long flange behind base. Install base with trim firmly abutting surface.

h. **P-2 Vinyl Trim**—Provide ½" to ¾" relief for trim at plaster base angle. Remove protective paper from adhesive on web of trim and insert trim into relief, adhesive against wall surface. Press upward until long flange seats against ceiling.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, DIAMOND, STRUCTO-GAUGE, SHEETROCK, THERMAFIBER, DURABOND, PER-A-TAPE, PYROBAR, FIRECODE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

TRUSSTEEL Studs and Gypsum Lath

915

system folder

fire rating	description	test no.	stc rating		comments
			11-f	16-f	
1 hr. est	Stl Stud—Resil Gypsum Lath & Plaster—2½" TRUSSTEEL studs 16" o.c.—TR-1 clips one side & TL-1 clips opp side—½" ROCKLATH—½" 100:2 gypsum sand plaster—perimeter caulked wt 12 width 4¾"	TL-69-14	(s)	46	
1 hr. est	Stl Stud—Resil Gypsum Lath & Plaster—3½" TRUSSTEEL Studs 16" o.c. —1½" THERMAFIBER sound attenu blks—TR-1 clips one side & TL-1 clips opp side—½" ROCKLATH—½" 100:2-100:2 gypsum sand plaster—perimeter caulked wt 14 width 5½"	USG-125-FT-G&H CK-664-38 Field Test KSO-1090072-b	(s) (s) (s)	49 52 46	2 caulked outlets on each side in field test
1 hr.	Stl Stud—Resil ½" IMPERIAL FIRECODE "C" plaster base & veneer plaster—2½" TRUSSTEEL studs 24" o.c.—RC-1 chan both sides spaced 16" o.c. att with ¼" Type T pan head screws—pl base att with 1" Type S screws—1/16" IMPERIAL plaster—joints taped wt 7 width 4¾"	T-4831-OSU	(f)		
		TL-69-278 TL-69-288	(s) (s)	48 36	TL-69-278 based on assembly with 1½" THERMAFIBER sound attenuation blankets
1 hr. est	Stl Stud—Gypsum Lath & Plaster—2½" TRUSSTEEL studs 16" o.c.—½" ROCKLATH—½" 100:2-100:2 gypsum sand plaster wt 13 width 4½"	TL-58-7	(s)	41	Record of proven performance

For wall furring application, see page 9.

description

In these systems, TRUSSTEEL Studs, gypsum lath and plaster are assembled into hollow, fire-resistant partitions with superior sound control features. With slight variations, they are also suitable for core walls and wall furring.

TRUSSTEEL Studs are made of high-tensile strength wire formed into an exceptionally strong non-load bearing stud. The open web truss design provides a maximum of free space for encasing pipes, conduits or ducts, horizontally, vertically or diagonally, without impairing the structural integrity of the assembly. When attached to floor and ceiling with runner tracks and stud shoes, TRUSSTEEL Studs form superior strength framing for lath and plaster surfaces, as outlined below.

Standard Plaster—½" ROCKLATH Plaster Base serves as a rigid base for ½" gypsum sand plaster. Lath is either directly attached to studs 16" o.c. with TRUS-Lok Clips TL-1 or resiliently attached with Resilient Clips TR-1. By using these specially designed resilient clips, the lath and plaster diaphragm is not rigidly coupled to the studs. Excellent sound-isolative efficiency of this system results from this resilient mounting of the plaster membrane and the column of air formed within the TRUSSTEEL Studs (see table above).

Veneer Plaster—½" IMPERIAL Plaster Base, a gypsum lath in large sheet form, provides a specially designed base for ¼" to ¾" IMPERIAL Plaster. In this construction, RC-1 SHEETROCK Resilient Channels 16" o.c. are screw-attached to TRUSSTEEL Studs set into Snap-In Runner Tracks anchored to floor and ceiling. RC-1 Channels are screw-attached to the studs, then faced with IMPERIAL Base screw-attached to the channels. IMPERIAL Plaster is applied after joints and interior angles are reinforced with IMPERIAL Tape. Attachment with specially designed RC-1 Metal Channels isolates the plaster base and plaster diaphragm from the studs. This resilient mounting, along with the use of THERMAFIBER Sound Attenuation Blankets within the cavity, provides excellent sound attenuation for the assemblies.

function and utility

Sound Control—The systems offer sound attenuation suitable for party walls at a low cost (see table above).

Fire Resistance—Noncombustible components provide systems with 1-hour and 2-hour ratings (see table above).

Durability—The high compressive strength (approx. 3,000 psi), abrasion- and crack-resistant features of IMPERIAL Plaster offer the durability needed in high-traffic areas, and obtainable with few other materials.

Strength—TRUSSTEEL Studs are formed of No. 7 gauge cold drawn wire, with a tensile strength of 90,000 psi. The resistance moment computed on the section modulus produces an exceptionally strong non-load bearing steel stud.

Lightweight—These systems weigh appreciably less than masonry partitions of the same thickness.

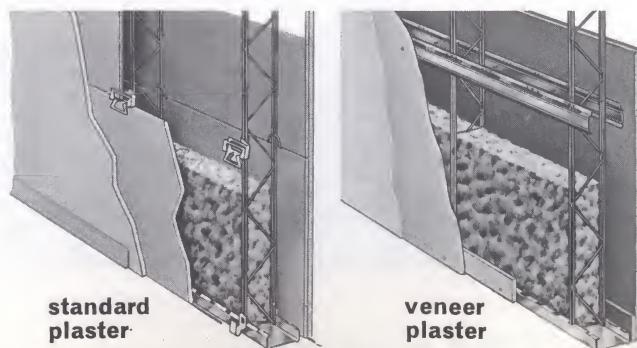
Performance—TRUSSTEEL Studs have been used since 1933 and now account for the majority of all non-load bearing steel studs used nationally. The continued high level of use indicates their acceptance based on their performance.

Economical—Structural integrity, strength, sound isolation, an open core wall and fire protection are provided by TRUSSTEEL Stud partitions at a lower cost than by other noncombustible assemblies.

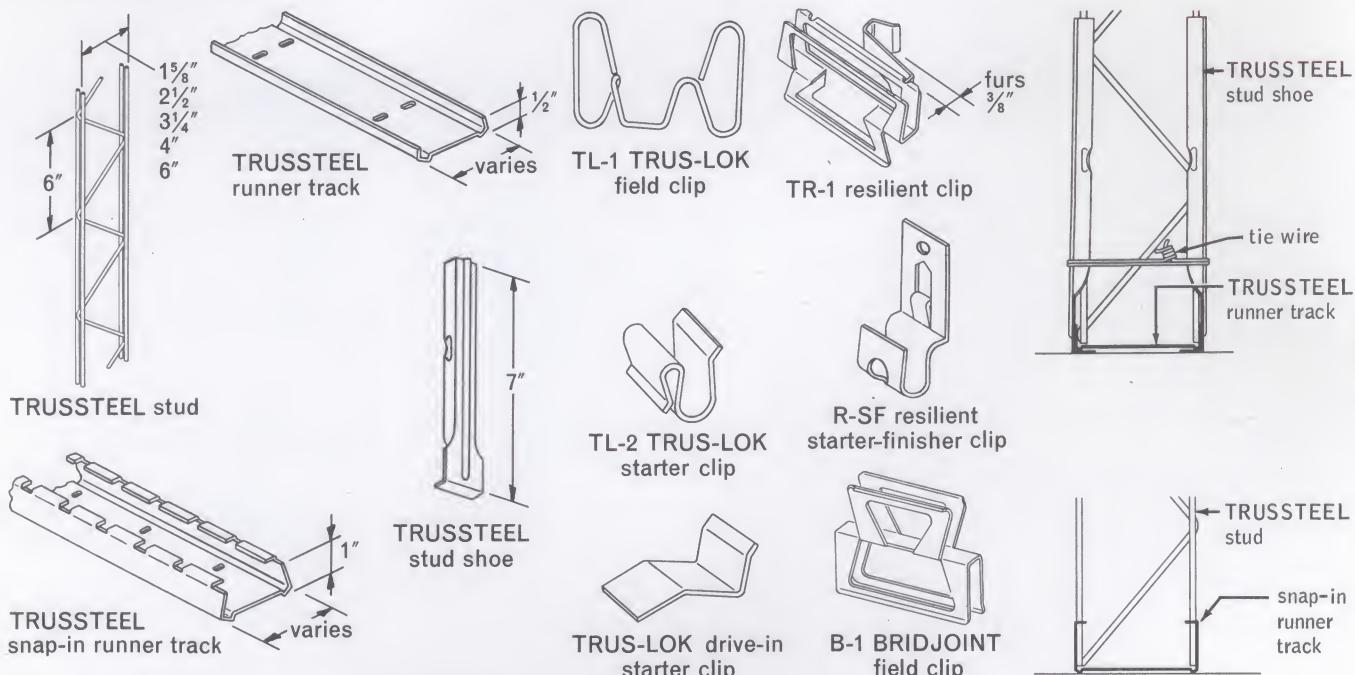
limitations

1. Non-load bearing.

2. Max. spacing: studs for ROCKLATH Base, 16" o.c.; studs for (continued on page 2)



components/technical data



see "plaster bases" product catalog for full description on accessories & sizes

limitations (continued from page 1)

IMPERIAL Base, 24" o.c.; resilient channel for **IMPERIAL** Base, 16" o.c. (see tables at right, for limiting height).

3. Door frames must be fabricated and anchored to prevent twisting and impact vibration (see details, pages 7 and 8).

4. To retain maximum sound isolation, precautions must be taken to prevent sound leakage (see Specifications).

5. Where mechanically suspended acoustical tile ceilings are used, finished partitions should extend from structural slab to structural slab, closing all openings.

6. **ROCKLATH** Base and standard plaster should be applied to only one side of TRUSSTEEL Studs with TR-1 Clips; use TL-1 Clips to attach **ROCKLATH** on other side.

7. With resilient channel systems, 1 5/8" TRUSSTEEL Studs are recommended for wall furring applications only, not for partitions. These systems are not recommended for use where exposed to abnormal moisture or excessively high humidity.

standard plaster finished partition thickness—limiting heights

stud width	section modulus	direct attach.	resil. attach.	max. partition heights studs 16" o.c. (2)(3)
1 5/8"	.0635 ² ³	3 5/8"	(1)	9'
2 1/2"	.1056 ² ³	4 1/2"	4 3/4"	15'
3 1/4"	.1420 ² ³	5 1/4"	5 1/2"	21'
4"	.1825 ² ³	6"	6 1/4"	22'
6"	.277 ² ³	8"	8 1/4"	26'

(1) Not recommended for resilient attachment. (2) Resilient partition limiting height is 10'.
(3) Limiting heights based on L/360 deflection.

veneer plaster finished partition thickness—limiting heights

stud width (in.)	partition width (in.)	stud spacing (in.)	max. partition height (1)		
			(2)	(3)	(4)
2 1/2	4 1/4	16 24	10'9" 9'6"	9'6" 8'6"	7'6" —(5)
3 1/4	5 1/2	16 24	13'0" 11'6"	11'6" 10'0"	9'3" 8'0"
4	6 1/4	16 24	15'3" 13'3"	13'6" 11'9"	10'9" 9'3"
6	8 1/4	16 24	20'9" 18'0"	17'6" 15'3"	14'0" 12'3"

(1) Limiting deflection criteria = L/360. (2) Max. height allowable where no superimposed load is applied perpendicular to partition. (3) Max. height allowable where a 5 psf uniform load is applied perpendicular to partition. (4) Max. height allowable where a 10 psf load is applied perpendicular to partition. (5) Limiting height is less than accepted standard.

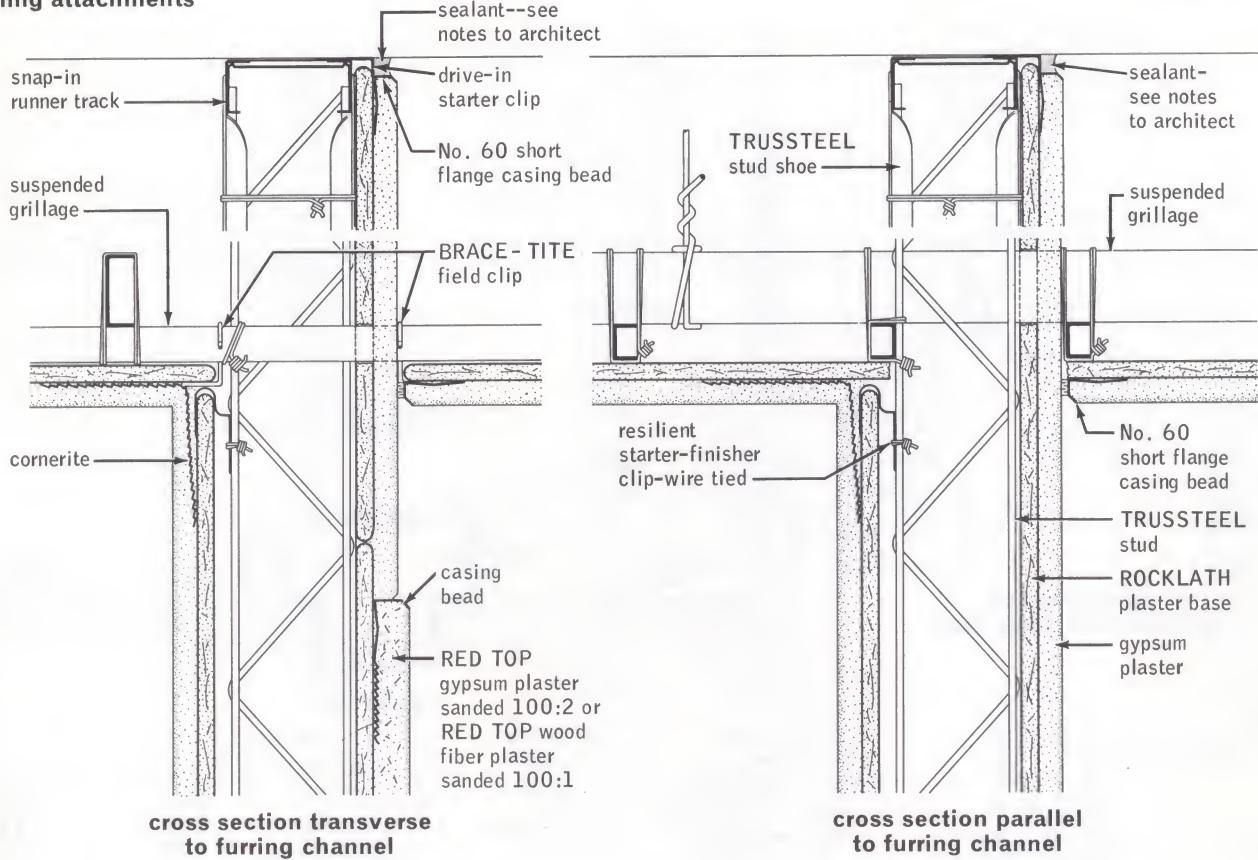
sound transmission loss—db

test no.	method	band center frequency—Hz																STC					
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800	3150	4000	
USG-125FT-G&H	Lab	35	—	49	—	49	—	52	—	56	—	56	—	59	—	49	—	48	—	54	—	60	49
KSO-1090072-b	Field	35	—	37	—	46	—	46	—	49	—	53	—	55	—	47	—	47	—	54	—	60	47
		34	37	—	40	46	46	—	44	48	52	—	53	55	47	—	42	47	51	—	56	60	46
TL-69-14	Lab	28	31	—	35	38	41	—	44	48	51	—	54	55	51	—	42	42	47	—	50	54	46
CK-664-38	Lab	36	44	—	47	48	49	—	50	50	50	—	51	52	51	—	50	52	53	—	55	56	52
TL-69-278	Lab	24	30	—	36	40	44	—	49	52	54	—	55	56	57	—	54	45	45	—	50	53	48
TL-69-288	Lab	17	20	—	24	25	27	—	31	35	39	—	44	47	49	—	45	37	37	—	43	46	36

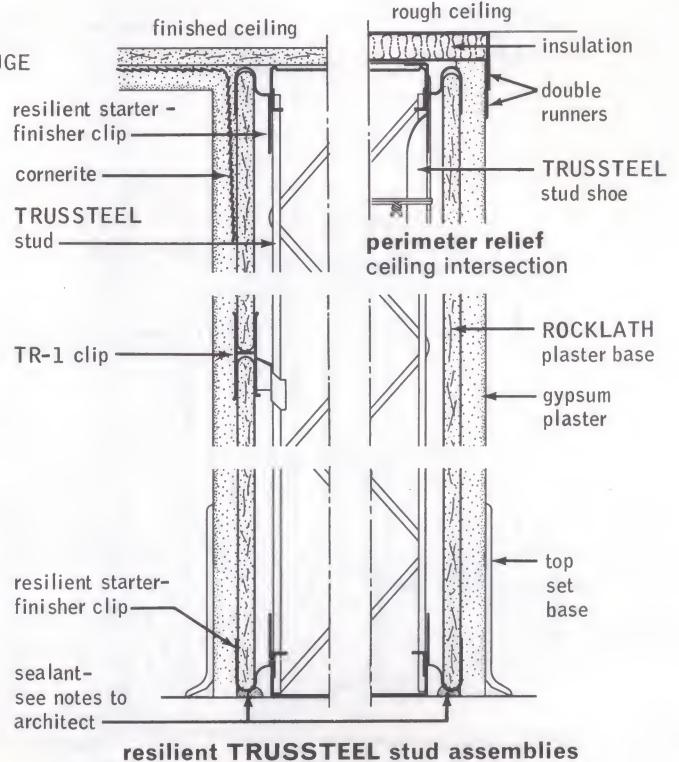
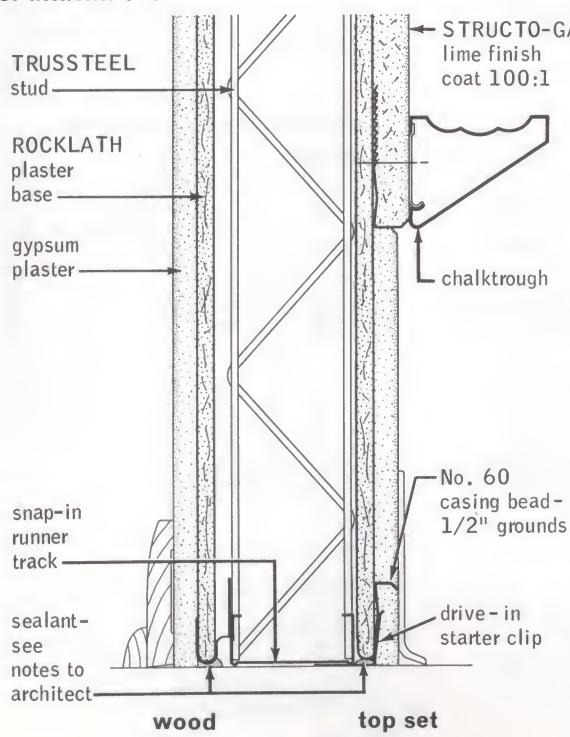
details/resilient attachment

scale: 3" = 1'-0"

ceiling attachments

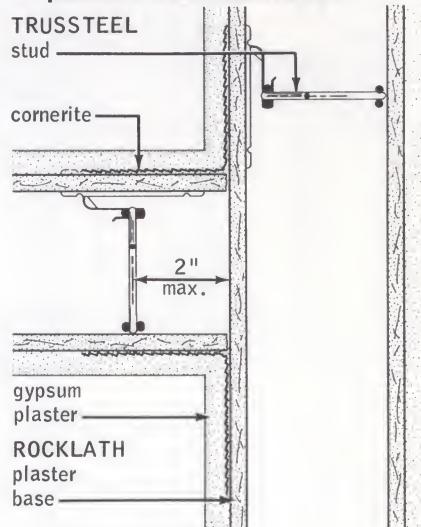
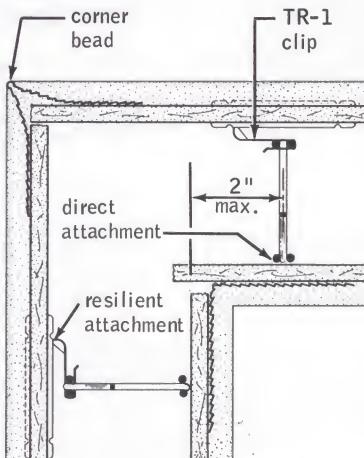
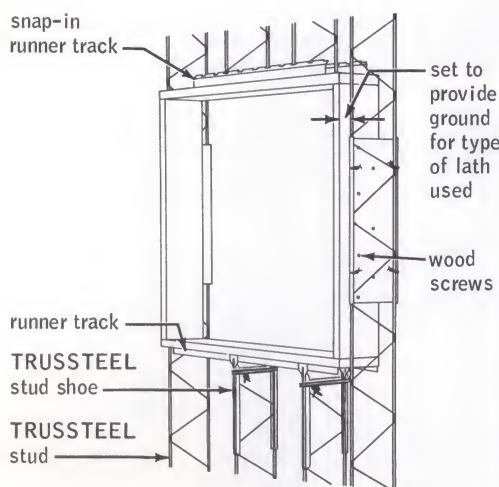
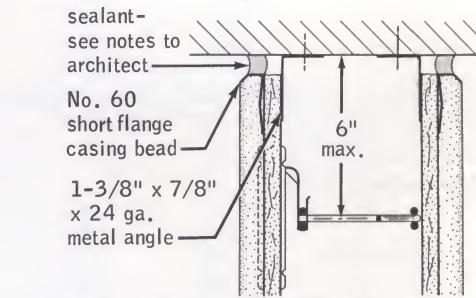
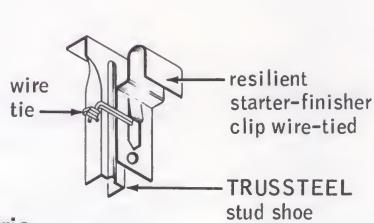
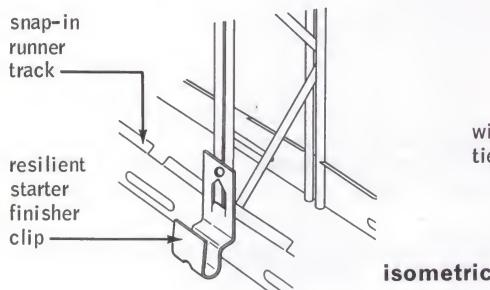
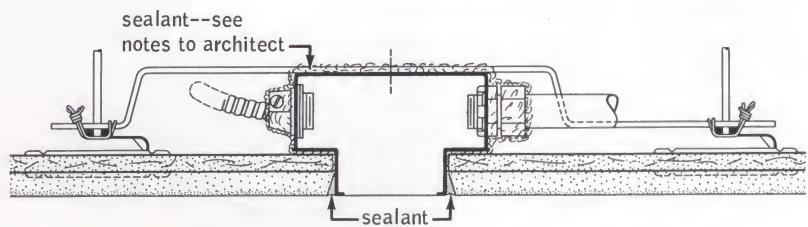
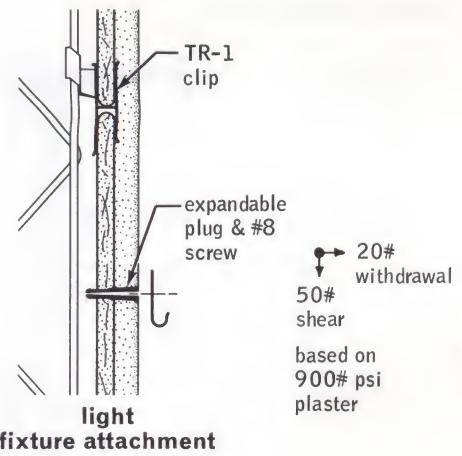
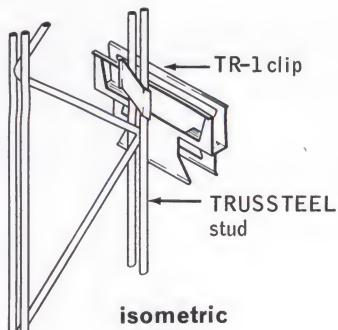
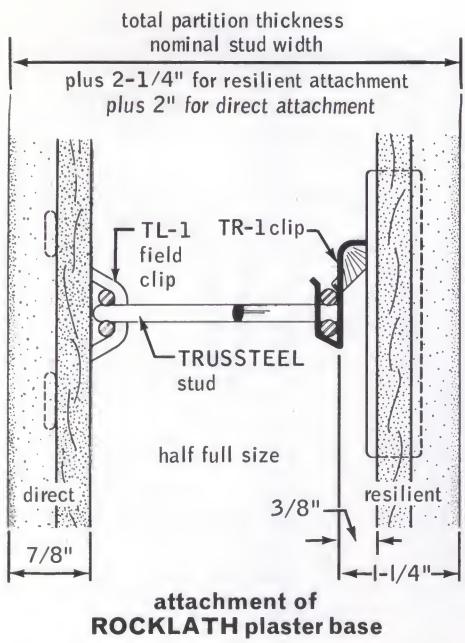


floor attachment



details

scale: 3" = 1'-0"



borrowed light or cabinet frame

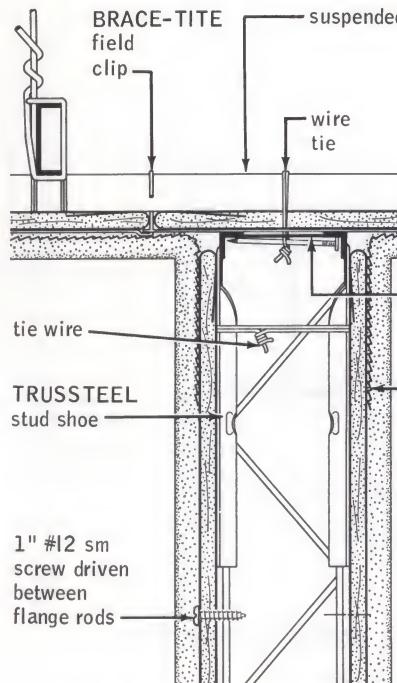
corner

partition intersection

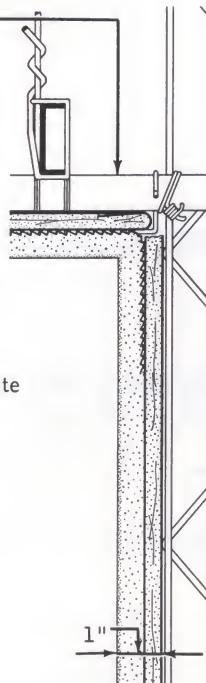
details/direct attachment

ceiling attachments

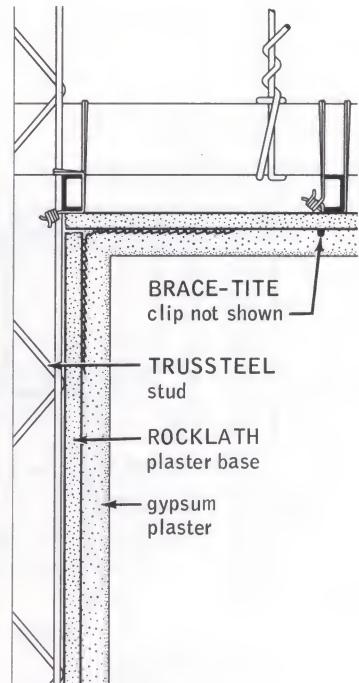
scale: 3" = 1'-0"



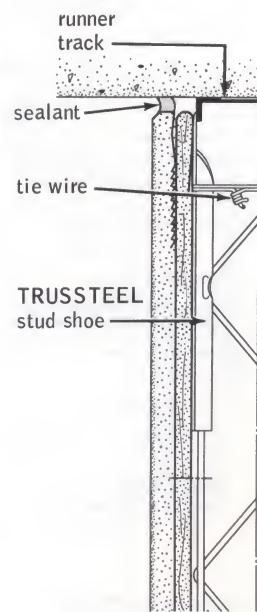
cross section transverse to furring channel



cross section transverse to furring channel

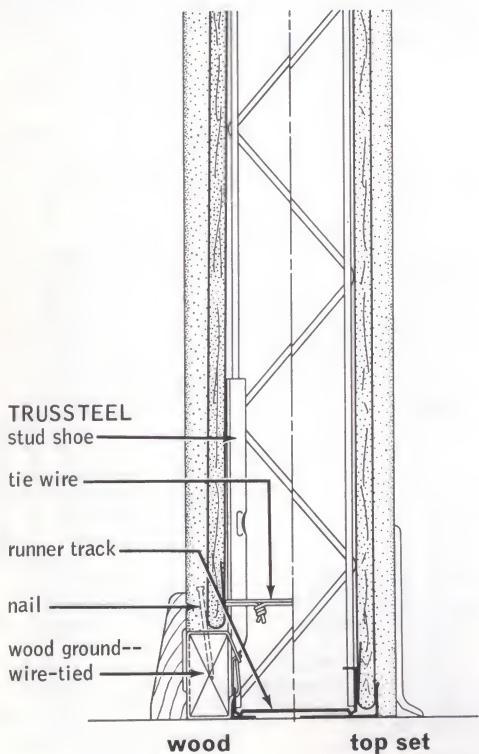


cross section parallel to furring channel



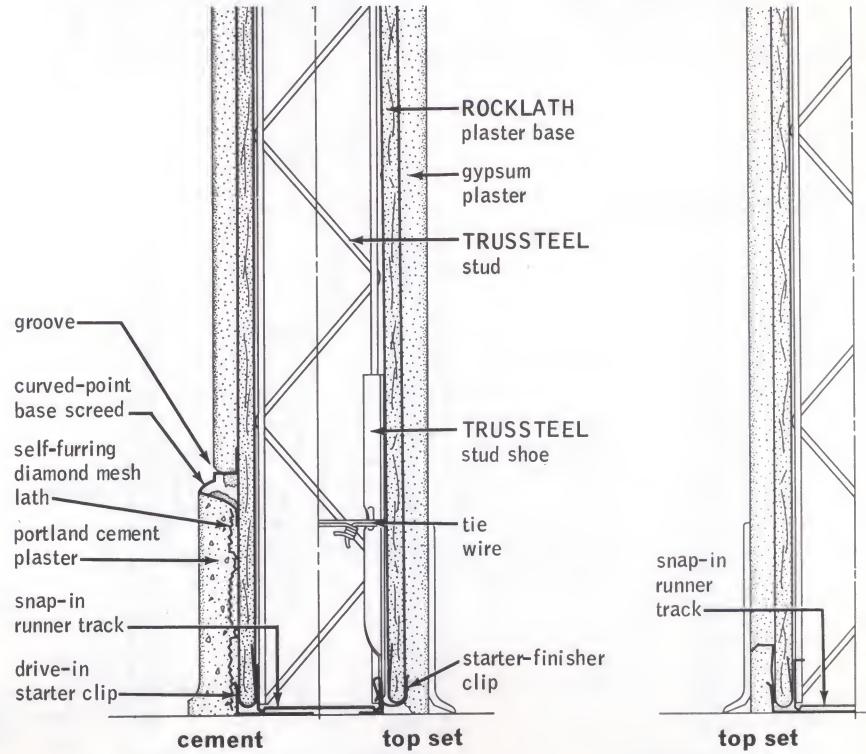
attachment to concrete ceiling slab

floor attachments



wood

top set



cement

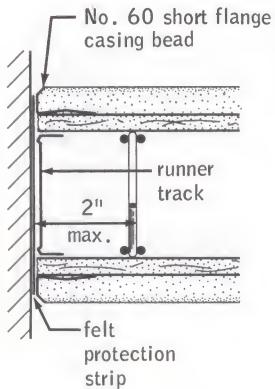
top set

top set

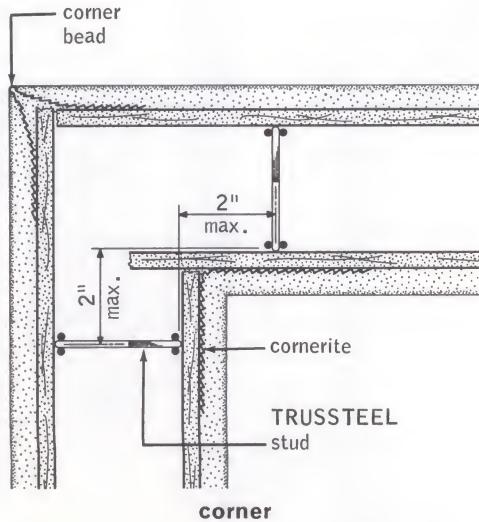
details/direct attachment

scale: 3" = 1'-0"

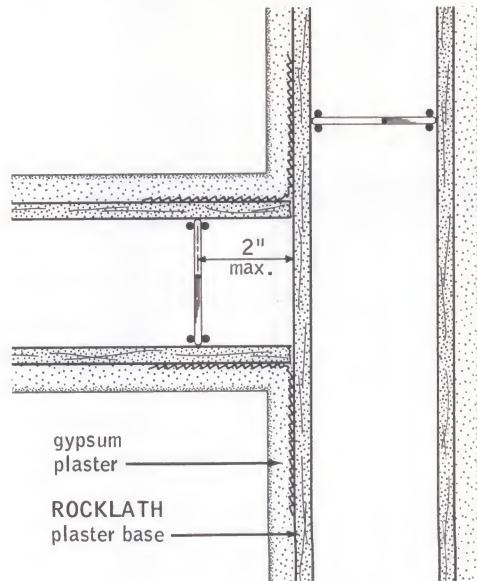
intersecting partitions



partition wall intersection

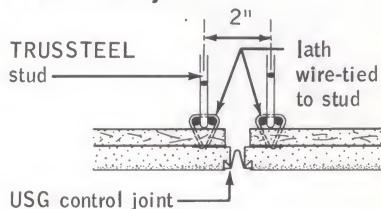


corner

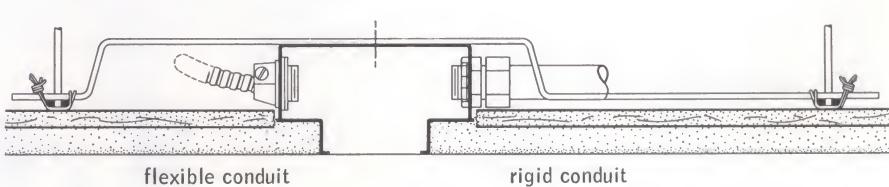


partition intersection

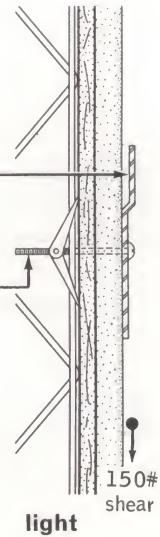
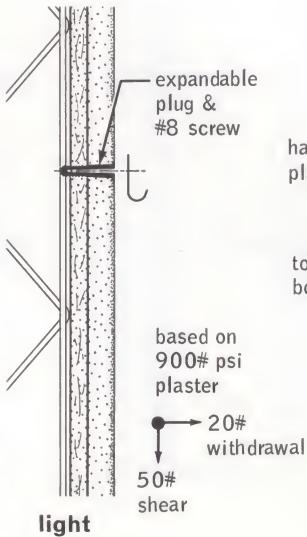
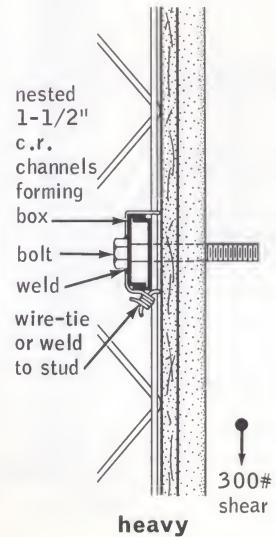
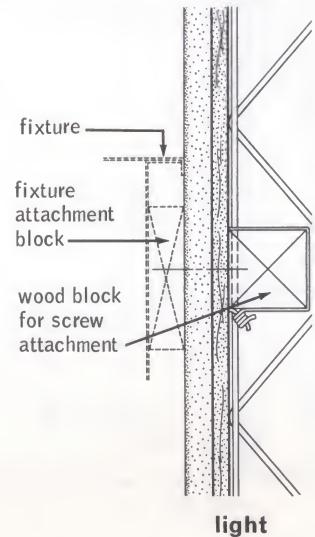
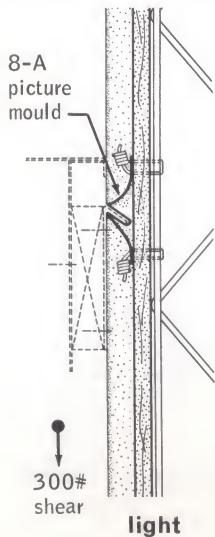
wall control joint



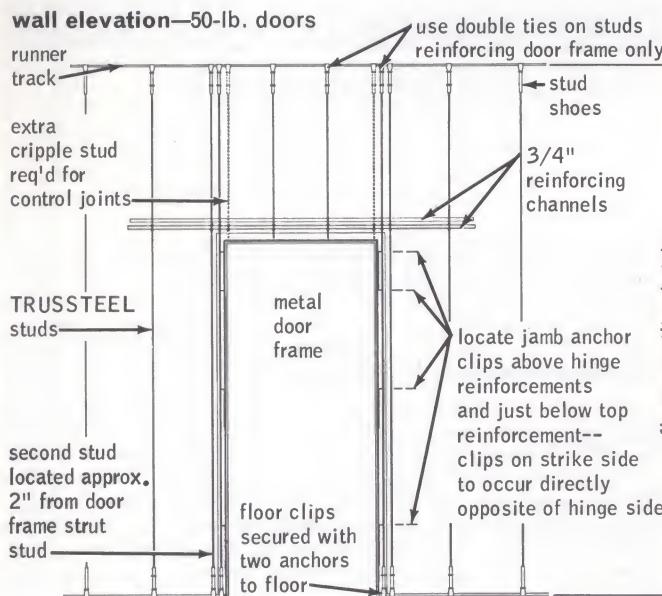
electrical outlet



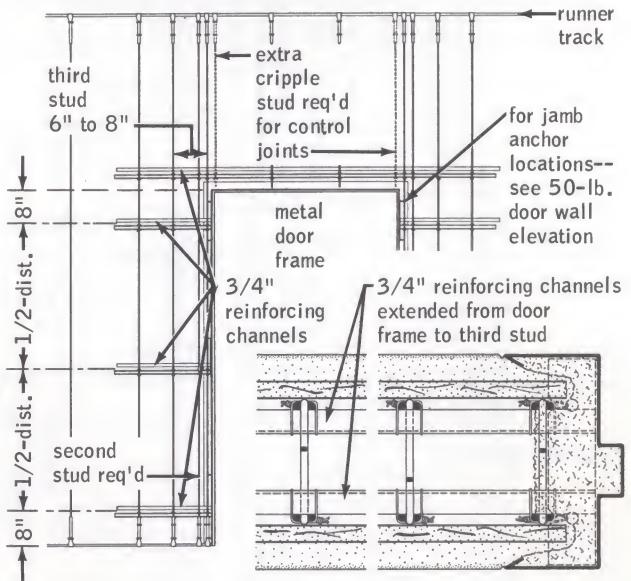
fixture attachments



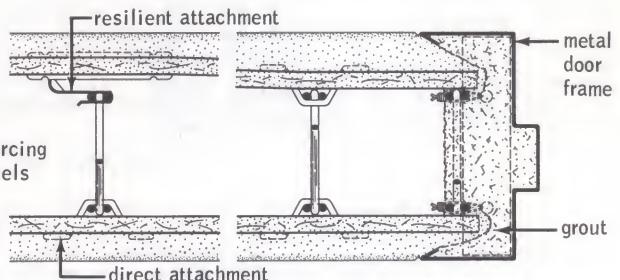
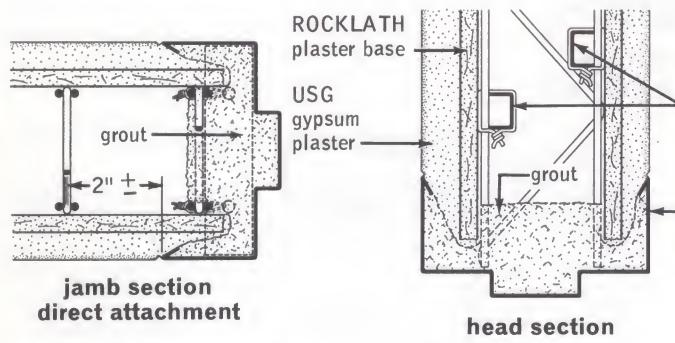
details/door frames



wall elevation—50 to 200-lb. doors

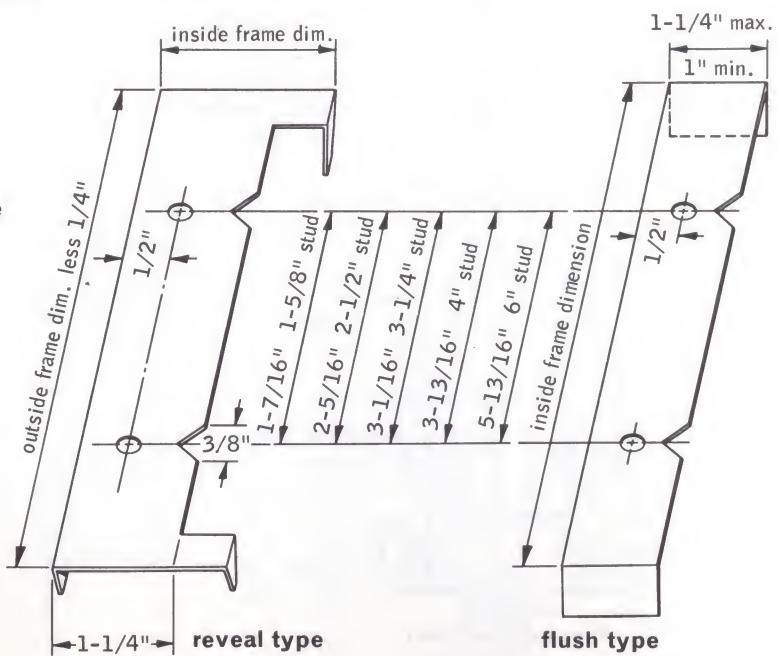
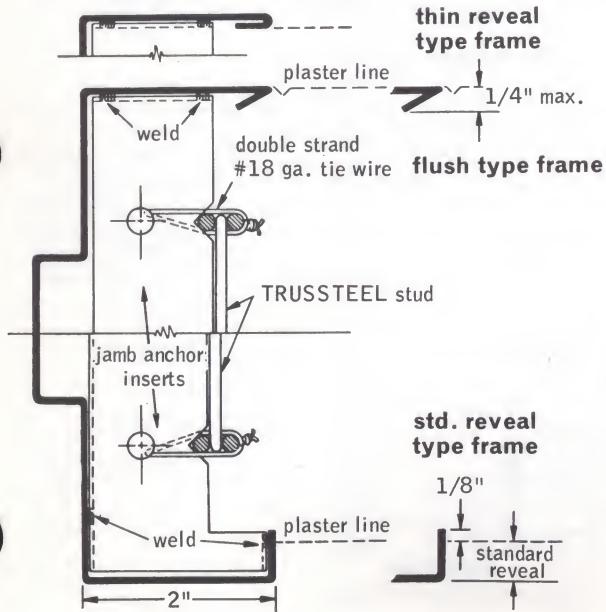


reinforced jamb



jamb section

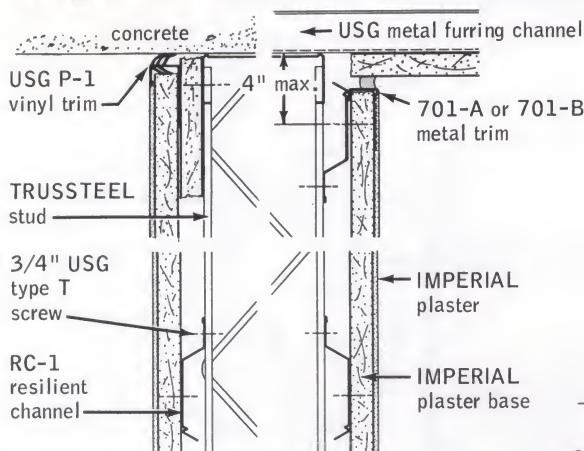
jamb anchor inserts/half size



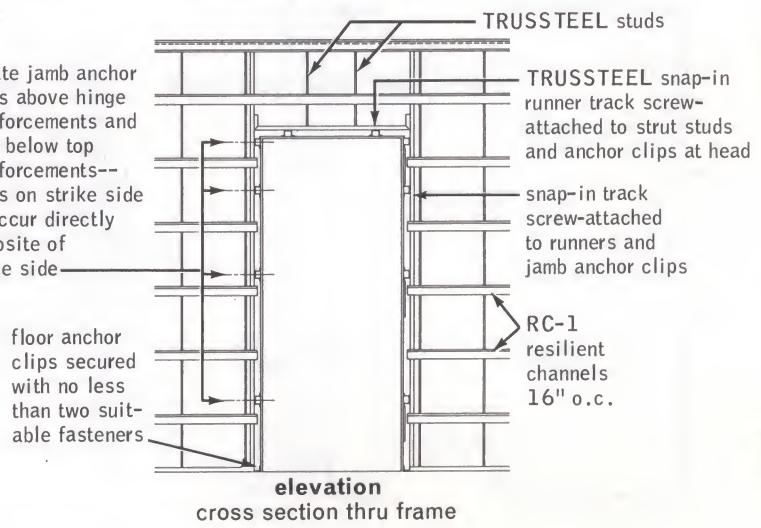
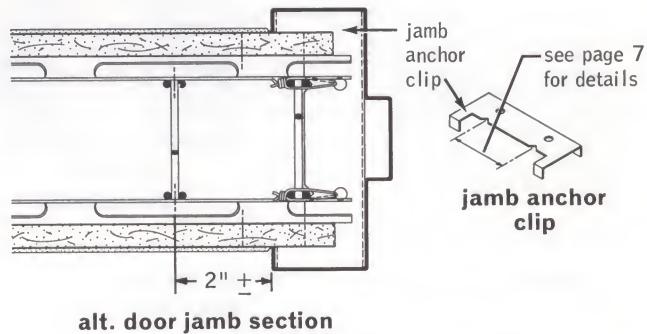
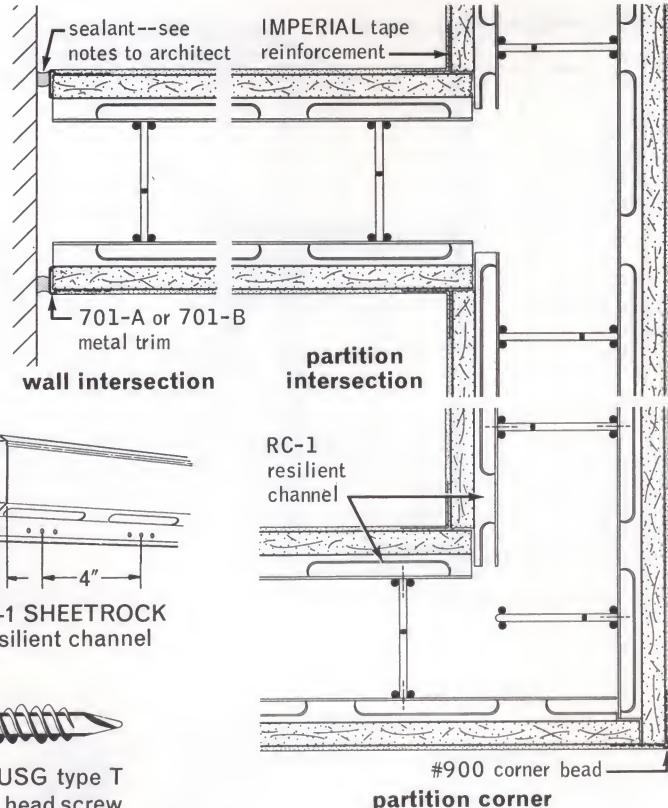
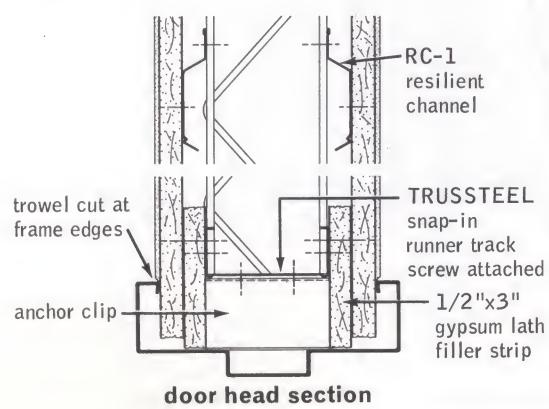
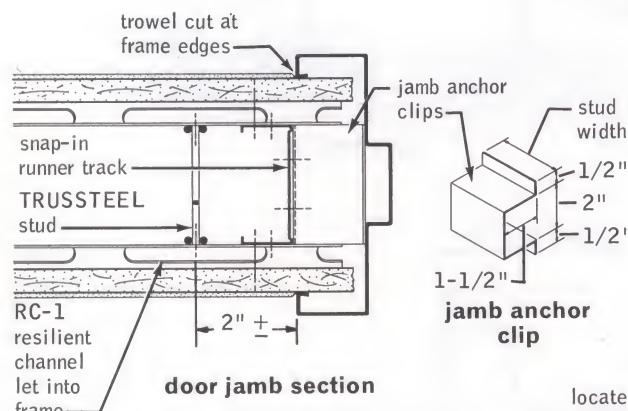
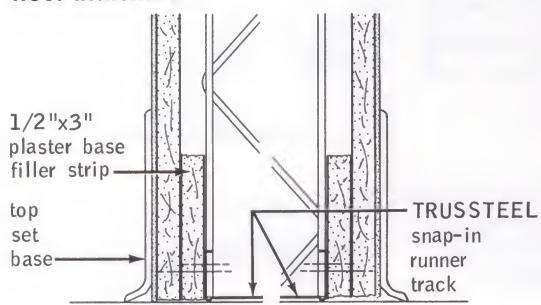
details

scale: 3" = 1'-0"

ceiling attachment



floor attachment



elevation
cross section thru frame

exterior wall furring

TRUSSTEEL Studs and Gypsum Lath

description	comments
TRUSSTEEL Studs 16" o.c. cross braced 4' o.c. on back chord, $\frac{3}{8}$ " Foil-Back ROCKLATH attached with TL-1 Clips, $\frac{1}{2}$ " sanded basecoat plaster, lime putty finish	Free standing; allows for pipe chase clearance; good vapor barrier
TRUSSTEEL Studs 24" o.c.—RC-1 channels spaced 16" o.c. attached with $\frac{3}{8}$ " Type T screws—Foil-Back IMPERIAL Plaster Base attached with 1" Type S screws—1/16" IMPERIAL plaster—joints taped	Free standing; allows pipe chase clearance; good vapor barrier

It is recommended that all exterior masonry walls be furred. Asphaltic or bituminous bonding agents are not recommended as a plaster base. TRUSSTEEL Studs, gypsum lath and plaster provide exterior wall furring systems that offer a maximum free space for encasement of pipes, ducts or conduits and a finished, readily decorated interior wall surface.

For standard plaster, the construction consists of TRUSSTEEL Studs as vertical members braced with horizontal $\frac{3}{4}$ " channels. A channel at the mid-point between the floor and ceiling is attached to the wall with USG Adjustable Wall Furring Brackets not more than 32" o.c. horizontally. TRUSSTEEL Studs spaced 16" o.c. are wire-tied to these horizontal channels. $\frac{3}{8}$ " Foil-Back ROCKLATH, 16" x 96", is clipped to the TRUSSTEEL Studs and plastered to $\frac{1}{2}$ " grounds. The Adjustable Wall Furring Brackets and extra channel at mid-height may be omitted to obtain free-standing furring.

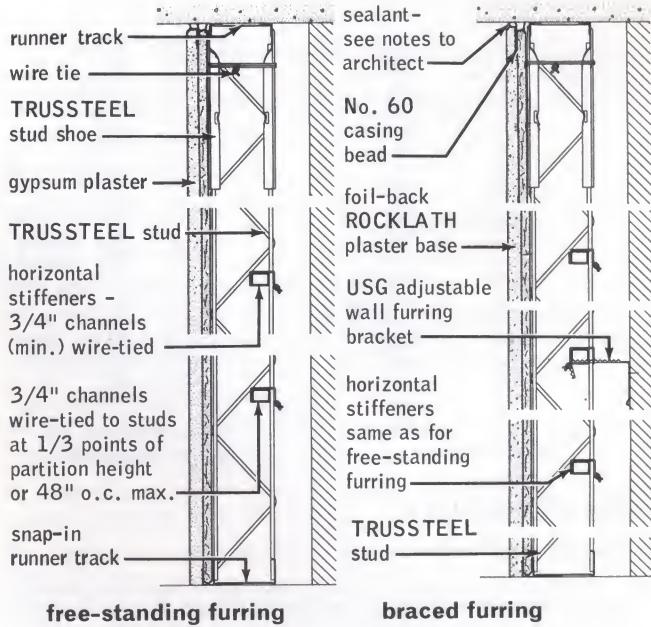
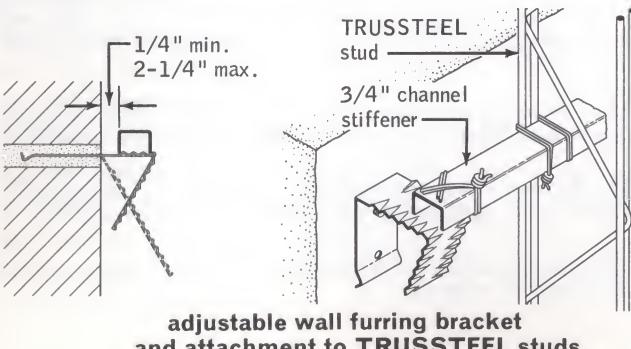
TRUSSTEEL stud size	maximum height ¹	
	braced furring	free-standing furring
1 $\frac{1}{2}$ "	9'	6'
2 $\frac{1}{2}$ "	15'	10'
3 $\frac{1}{4}$ "	21'	14'
4"	22'	15'
6"	26'	17'

(1) Based on 16" spacing between studs and L/360 deflection.

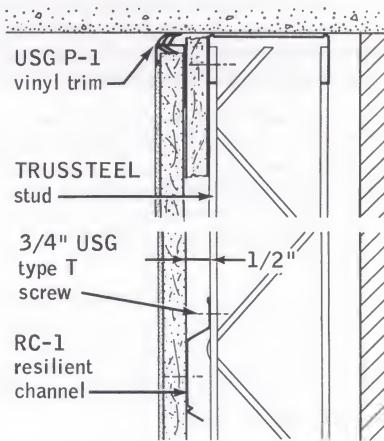
For veneer plaster, the construction consists of TRUSSTEEL Studs as vertical members, spaced 24" o.c. and inserted top and bottom into TRUSSTEEL Snap-in Runner Track. RC-1 Channels, spaced 16" o.c., are screw-attached to the TRUSSTEEL Studs on side to be faced. $\frac{1}{2}$ " IMPERIAL Base is screw-attached to the RC-1 Channels, then plastered to $\frac{1}{16}$ " to $\frac{3}{32}$ " grounds.

TRUSSTEEL stud size	stud spacing	maximum height (1)
1 $\frac{1}{2}$ "	16"	9'-0"
	24"	8'-0"
2 $\frac{1}{2}$ "	16"	10'-9"
	24"	9'-6"
3 $\frac{1}{4}$ "	16"	13'-0"
	24"	11'-6"
4"	16"	15'-3"
	24"	13'-3"
6" (2)	16"	20'-9"
		18'-0"

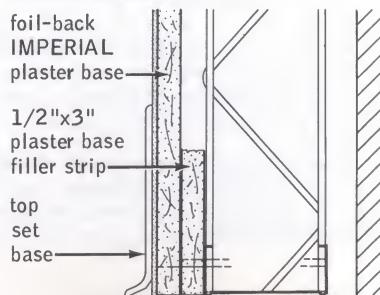
(1) Limiting deflection criteria = L/360 at 0 psf. (2) TRUSSTEEL runner track and shoes required.



ceiling attachment



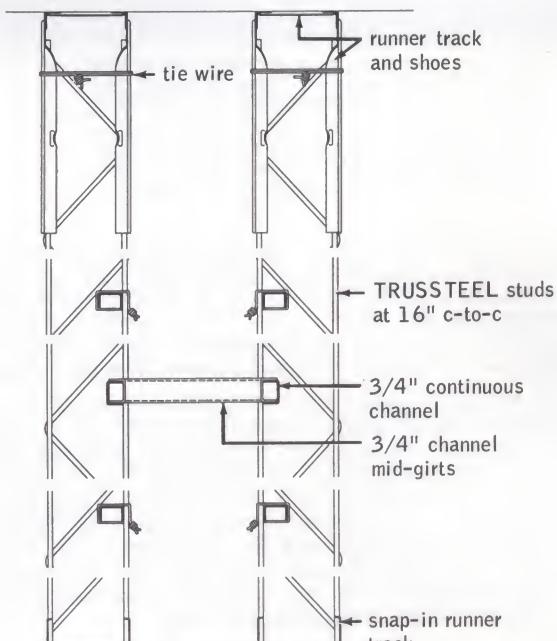
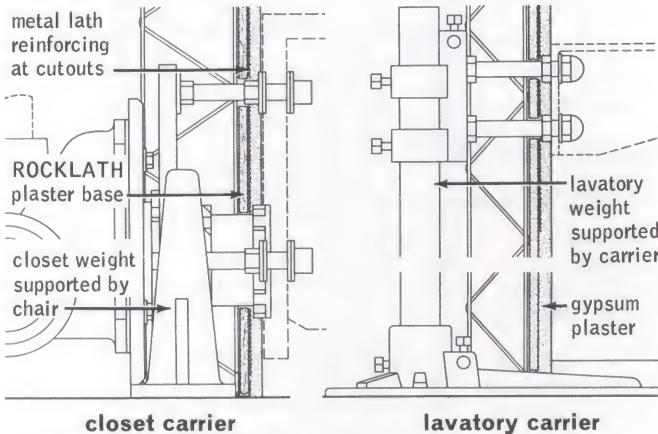
floor attachment



core walls/specifications

Core walls, as vertical shafts encasing the usual plumbing supply and waste lines, vent ducts and electrical conduits, require more free space than can be provided within the usual partition assembly.

Core walls are easily constructed using TRUSSTEEL Studs and ROCKLATH, provided proper bracing is used to compensate for the stress skin action of the one side. The non-lathed side of the studs should be braced with $\frac{3}{4}$ " continuous channel girts at the quarter points vertically or 48" o.c. maximum, and $\frac{3}{4}$ " channel bracket mid-girts spaced 36" o.c. horizontally.



TRUSSTEEL stud core wall framing

specifications

notes to architect

1. 16" x 96" ROCKLATH Plaster Base is preferred on standard plaster TRUSSTEEL Stud installations, and particularly over door frames or other openings.

2. Fire-rated partitions using standard plaster require that TRUSSTEEL Studs be attached to TRUSSTEEL or Snap-In Runner Track with TRUSSTEEL Stud Shoes at the ceiling.

3. TRUSSTEEL Snap-In Runner Track with studs cut accurately to lengths may be used for floor and ceiling attachment where the construction is non fire-rated. This track may be used at the floor on fire-rated partitions.

4. Metal door and borrowed-light frame material should be at least 16-ga. steel, shop primed, with throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Four jamb anchor inserts should be provided in each jamb, welded to the trim returns.

Grouting and additional reinforcement at the jamb are recommended for all door frames and are required for heavy (over 50 lbs. with hardware) or oversize doors which also require use of door closers and bumpers. Grout should be raked out to allow insertion of lath and plaster into frame; lath and plaster must not terminate against trim.

5. Lath and plaster surfaces should be isolated with control joints or other means where: (a) partition abuts a structural element (except floor) or dissimilar wall or ceiling; (b) construction changes within the plane of the partition; (c) partition run exceeds 30'. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

6. Penetrations of the lath and plaster diaphragm, such as door frames and borrowed-light openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.

7. Where a plaster surface is flush with metal, metal bucks, metal windows, or metal base, the plaster should be grooved between the two materials.

8. **Fixture Attachment**—Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Heavy fixture attachment is not recommended on resilient lath and plaster surfaces.

Wood inserts for fixture attachment on non-resilient surfaces must always be wire-tied to inside of stud chords to prevent breaking up stress skin of lath and plaster.

9. **Ceramic Tile**—Where required, ceramic tile may be installed: (a) by changing plaster base from ROCKLATH to Metal Lath (see U.S.G. System Folder SA-914); (b) by adhesive application over level brown coat gypsum plaster in accordance with adhesive manufacturer's specifications. IMPERIAL Plaster Base is not recommended as a base for the adhesive application of ceramic, metal and plastic tile. SHEETROCK W/R Gypsum Panels are recommended for this use.

10. Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Use sand aggregate only. Door and borrowed-light openings are not recommended in sound control partitions.

11. Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

12. Resilient channel spacing may be increased to 24" o.c. if $\frac{5}{8}$ " IMPERIAL Base and two-coat plaster application are used.

13. Proper sealing of IMPERIAL Plaster surfaces before decorating is essential.

- 14.** See U.S.G. product folders in this series: *Gypsum Plasters Folder SA-918* for plaster specifications; *Plaster Bases & Accessories Folder SA-917* for general lathing specifications; *Paint Products Folder SA-933* for paint specifications.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before plaster base installation. Ventilation should be provided to carry off excess moisture.

b. When low humidity, high temperatures and rapid drying conditions exist during plaster base and plaster application, DURABOND Joint Compound and PERF-A-TAPE Reinforcement shall be used on all veneer plaster base joints and internal corners and allowed to set and dry thoroughly before plaster application.

Part 2: products

2.1 materials

- a. TRUSSTEEL Runner Track—widths 1 5/8", 2 1/2", 3 1/4", 4", or 6" (see Note 2, page 10).
- b. TRUSSTEEL Snap-In Runner Track—widths 1 5/8", 2 1/2", 3 1/4", or 4" (see Note 3, page 10).
- c. TRUSSTEEL Studs—widths 1 5/8", 2 1/2", 3 1/4", 4", or 6" (see Note 3, page 10).
- d. TRUSSTEEL Stud Shoes.
- e. R-SF Resilient Starter—Finisher Clip.
- f. TRUS-LOK Drive-in Starter Clip.
- g. TR-1 Resilient Field Clip.
- h. TL-1 TRUS-LOK Field Clip.
- i. BRIDJOINT B-1 Field Clip.
- j. USG Corner Bead No. (1-A)(4-R)(10-A)(900).
- k. USG Self-Furring Junior Diamond Mesh Metal Lath.
- l. USG Cornerite (2" x 2") (3" x 3").
- m. USG Striplath.
- n. USG Casing Bead No. (4)(60)(66)(138).
- o. USG Base Screed No. 6-A.
- p. USG 8-A Picture Mould.
- q. USG Adjustable Wall Furring Bracket.
- r. USG Cold-Rolled Channels 3/4", 1 1/2", 2".
- s. 18-ga. tie wire.
- t. ROCKLATH Plaster Base—(3/8" x 16" x 48") (3/8" x 16" x 96") (regular) (foil-back).

- u. THERMAFIBER Sound Attenuation Blankets (1") (1 1/2") (2") x 24" x 48".
- v. IMPERIAL Plaster Base (Regular) (FIRECODE "C")—1/2" thick, 48" wide, lengths as required.
- w. RC-1 SHEETROCK Resilient Channel.
- x. Fasteners—USG Brand 3/8" Type S and Type S-12 Pan Head Screws; 3/4" Type T Pan Head Screws; 1" and 1 1/8" Type S Bugle Head Screws.
- y. IMPERIAL Tape—(Type P) (Type S) for joint reinforcement.
- z. PERF-A-TAPE Reinforcement and DURABOND Joint Compound.
- aa. USG Metal Trim No. (701-A)(701-B).
- bb. USG P-1 Vinyl Trim.
- cc. USG Control Joint.
- dd. USG Acoustical Sealant.

Part 3: execution

3.1 stud system erection

Install TRUSSTEEL Studs of the size shown on the plans or as herein specified, spaced max. (16") (24") o.c. Accurately align all partitions according to the partition layouts.

Securely attach runner tracks:

1. To concrete slabs—Using concrete stub nails or power-driven anchors, spaced max. 24" o.c.
2. To ceiling grillage—Wire-tie, using a double strand of 18-ga. tie wire, spaced max. 24" o.c.
3. To plaster or gypsum base—Toggle bolt or wire-tie, spaced max. 24" o.c.

Place studs, cut to nominal ceiling height, vertically into and resting upon floor runner track. Top of studs can be no more than 3/8" from ceiling with Snap-In Track; no more than 3" from ceiling with TRUSSTEEL Runner Track.

Secure studs to Snap-In Track by twisting until studs engage notches in both floor and ceiling tracks; to TRUSSTEEL Runner Track with TRUSSTEEL Stud Shoes, crimped or wire-tied with double-strand 18-ga. wire.

Secure studs immediately adjacent to door and borrowed light frames with two wire ties of double-strand 18-ga. wire.

3.2 installation for veneer plaster

3.2.1 door frames

Install vertical strut studs, consisting of cut-to-length TRUSSTEEL Snap-In Runner Track, adjacent to TRUSSTEEL Studs at each side of each door opening. Anchor strut studs to floor and ceiling runners with 3/8" type S screws at each flange intersection. Install headers formed from Snap-In Track, miter-cut and bent 90° at each end to abut against strut studs. Anchor headers to strut studs with two 3/8" type S screws at each end. Anchor door frames with 3/8" type S-12 screws driven through header and strut studs into frame anchor clips. For heavy oversize doors, install horizontal reinforcing channels in pairs at each side of door jamb and positioned 8" from head and floor and at mid-height. Securely tie these aligning channels to inside of stud chord at each intersection.

3.2.2 resilient channel erection

Screw-attach 1/2" thick x 3" wide continuous filler strip of IMPERIAL Plaster Base to both sides of Snap-In Runner Track at the floor (also at the ceiling for fire-rated construction). Attach strip with 1" type S screws 24" o.c. Position RC-1 Resilient Channels 16" o.c. vertically and secure to TRUSSTEEL Studs by driving a 3/4" type T pan head screw through the RC-1 attachment flange into the space between the two wires forming the chord of the stud. If the RC-1 attachment flange

falls over protruding lugs on the stud, place the RC-1 with resilient flange in opposite direction.

3.2.3 plaster base application

Apply IMPERIAL Plaster Base of maximum practical length, with the long dimension at right angles to the channels and with end joints centered over the channel, staggered and neatly fitted. Fasten plaster base to channels with 1" type S screws spaced 12" o.c. in the field of the base and along abutting edges. Use 1½" type S screws at floor and ceiling where plaster base is supported by filler strips. Drive screws at least ¾" from ends or edges of base. Be certain base is properly supported around all cut-outs and openings.

3.2.4 accessory application

When low humidity, high temperatures and rapid drying conditions exist, use DURABOND Joint System on all joints and internal corners and allow to set and dry thoroughly before applying finish plaster.

a. **Reinforcing Tape**—Apply over full length of all plaster base joints; do not overlap at intersection.

Type P Tape—Press firmly along entire length to insure firm wrinkle-free attachment.

Type S Tape—Apply with spring-driven stapler using ¾" staples. Use two staples at each end of tape and stagger intermediate staples 24" o.c. along length of tape. At wall-ceiling intersections and interior corners, staple tape 24" o.c. along ceiling edge or on one edge only. For fire-rated assemblies, staple tape 8" o.c.

b. **Corner Bead**—Attach to all vertical and horizontal exterior corners with nails or ¼" rosin-coated staples spaced 12" o.c. along both flanges.

c. **Casing Bead**—Install 701-A Metal Trim, expanded-mesh flange out, over plaster base at door and window openings; attach with nails driven into door or window buck. Install 701-B Metal Trim, expanded-mesh flange out, over plaster base at junction with rough concrete or masonry; attach with ¼" rosin-coated staples or with nails driven into framing.

d. **Screws**—Power-drive and set so screwhead is flush with surface of plaster base without tearing through face paper.

e. **Vinyl Trim**—Slip P-1 Trim over plaster base with long flange behind base. Install plaster base with trim firmly abutting surface.

f. **Control Joint**—Provide in the face layer as indicated and fasten with ¼" rosin-coated staples not over 12" o.c. on both flanges along entire joint length. Be certain that resilient channel is interrupted at junction of control joint installation.

3.3 installation for standard plaster

3.3.1 door frames

Insert studs into steel door frame engaging notches of jamb anchor clips, and securely wire tie each chord of stud to each jamb anchor. Install second stud each side of door frame, approximately 2" from strut stud.

Install two ¾" cold-rolled channels over head of door, extending out to engage third stud on each side. For heavy oversize doors, install additional horizontal reinforcing channels in pairs each side of door jamb and position 8" from head and floor and at mid-height. Securely tie these aligning channels to inside of stud chord at each intersection.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, TRUSSTEEL, ROCKLATH, IMPERIAL, BRIDJOINT, TRUS-LOK, THERMAFIBER, SHEETROCK, DURABOND,

3.3.2 direct plaster base attachment

Apply ROCKLATH Plaster Base starting at bottom with long dimension at right angles to studs. Butt lath together and clip in place using (TRUS-LOK Starter Clips TL-2) (Drive-in Clips) and TRUS-LOK Field Clips TL-1, spaced not to exceed 16" o.c. Fasten finishing course of ROCKLATH with 1" #12 flat head self-tapping sheet metal screws driven between vertical stud wires and spaced 8" from ceiling. Stagger end joints of lath between studs and align using BRIDJOINT B-1 Field Clips at all lath corners. Cut lath accurately and fit neatly around all electrical outlets, openings, etc.

3.3.3 resilient plaster base attachment

Apply ROCKLATH Plaster Base starting at bottom with long dimension at right angles to studs. Butt lath together and resiliently clip in place using Resilient Starter-Finisher Clip R-SF and Resilient Field Clip TR-1, spaced max. 16" o.c. Stagger end joints of lath between studs and align using BRIDJOINT B-1 Field Clips at all lath corners. Cut lath accurately and fit neatly around all electrical outlets, openings, etc.

3.3.4 wall furring erection

On partitions designated as vertical furring, bridge back chord of TRUSSTEEL Stud using continuous ¾" channels at third points or not to exceed 48" o.c. and at mid-height. Saddle-tie channels to each stud.

On braced furring, securely attach mid-point bridging channel to masonry back-up with USG Adjustable Wall Furring Brackets 32" o.c.

Install USG Adjustable Wall Furring Brackets with crimped edges up, using (one 2" cut nail in mortar joints of brick, clay tile, or concrete block or in field of lightweight aggregate blocks) (½" concrete stub nails or power-driven nails or other suitable fasteners in monolithic concrete) driven through top hole of bracket. Apply brackets to masonry walls at mid-height of furred wall and spaced not over 4" from columns or other abutting construction and not over 32" o.c. horizontally and 48" o.c. vertically, and as required above and below windows. Lay mid-height furring channel horizontally on furring brackets with legs down, and wire-tie to bracket with double-strand 18-ga. tie wire. Bend excess bracket length down.

3.3.5 accessory application

a. **Cornerite**—Install in all interior plaster angles. Staple at the edges.

b. **Metal Corner Bead**—Provide on all external plaster corners in single lengths whenever possible. Fasten securely with galvanized staples, spaced max. 8" o.c.; stagger in two wings.

c. **Casing Bead**—Install where indicated to provide full plaster grounds. Cut and miter ends accurately. Staple in place.

d. **Reinforcing**—Install a strip of self-furring diamond mesh lath over joints between dissimilar plaster bases. At all openings, reinforce corners by attaching a 6" x 12" piece of self-furring diamond mesh lath across corners. Staple in place.

e. **Base Screed**—Install 6" above finish floor unless otherwise indicated. Set screeds level, true to line, in lengths as long as practical, with joints aligned with a suitable splice. Staple in place.

f. **Control Joint**—Provide as detailed and where indicated. Staple in place.

PERF-A-TAPE, STRUCTO-GAUGE, RED TOP, BRACE-TITE, FIRECODE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

description and utility

UNITED STATES GYPSUM produces the industry's broadest and best-known line of plaster bases, metal structural members and lathing accessories. From these have been engineered dozens of partition, ceiling and wall furring assemblies, each of which provides different characteristics of structural stability, fire rating and sound transmission loss. Performance and specification of these assemblies are covered in individual U.S.G. System Folders, which are keyed in turn to the U.S.G. Construction Selector index.

Basic information on the plaster bases and accessories available for such assemblies is included here. Proper use of U.S.G. plaster bases and plasters provides the secure bond necessary in order to develop strength and resistance to abuse and cracking. A "mechanical" bond is formed when plaster is pressed through the mesh of metal lath, forming keys on the back side. A "suction" bond is formed when gypsum plaster is applied over gypsum lath and masonry bases; the tiny needle-like plaster crystals penetrate into the surface pores of the base by suction.

Six groups of bases and accessories are covered in this catalog: (1) Gypsum Plaster Bases; (2) USG Metal Lath; (3) PYROBAR Partition Tile; (4) USG Corner Reinforcements, Screeds and Control Joints; (5) USG Lath Attachment Clips and Screws; (6) USG Structural Accessories.

Functions, properties and limitations are treated within each group. A general lathing specification appears on pages 11 and 12. For information on USG plastering products, see Product Folder SA-918.

While requirements differ for each project, good practices for normal construction problems are well established. In the selection of plaster bases and accessories, the following general recommendations are listed in the order of preference:

Masonry Plaster Bases

1. PYROBAR Partition Tile (see Folder SA-405)
2. Dense Concrete Block
3. Clay Tile
4. Lightweight Concrete Block

A masonry partition to be plastered should be built with the same care as if the masonry were to be left exposed. Considerations should include (a) lintels over door frames; (b) good mortar, with full mortar beds and end joints; (c) masonry laid with a running bond; (d) chases held to minimum in size and number; (e) control joints in long runs; (f) control joints where masonry partitions abut concrete structural members.

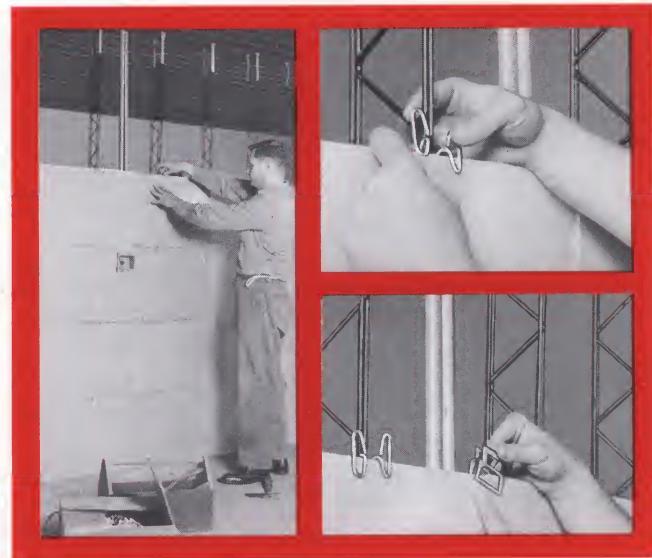
Lath Plaster Bases

1. USG Metal Lath (see Folders SA-805, SA-914)
2. ROCKLATH Plaster Base (see Folders SA-805, SA-915)
3. IMPERIAL Plaster Base (see Folders SA-805, SA-912, SA-913, SA-915, SA-922)
4. USG R.H. Base

Partition systems composed of lath and plaster diaphragms supported by a grillage or attached to studs may have various plaster bases selected to best meet the desired conditions for sound control or fire resistance.

Steel Stud Partitions

Partition systems incorporating steel studs can be evaluated on the basis of structural characteristics, section modulus and the ultimate tensile strength of the steel used in stud fabrica-



tion, and the stress skin action incident to the method of attachment.

1. TRUSSTEEL Studs (see Folders SA-805, SA-914, SA-915)
2. USG Steel Studs (see Folders SA-805 and SA-912)

Solid Plaster Partitions

In solid plaster partitions, a 2" thickness is the minimum recommended; the performance can be improved by increasing the thickness to 2 1/4" or 2 1/2". Three lathing systems are recommended in the following order:

1. USG 3/4" Channels and Diamond Mesh Metal Lath
2. USG 3/8" Riblath Metal Lath, Studless
3. 1/2" Long Length ROCKLATH Plaster Base

types and functions

1. Gypsum Plaster Bases

description

ROCKLATH, IMPERIAL and USG R.H. plaster bases are gypsum lath in sheet form providing a rigid base for the economical application of gypsum plasters. A special gypsum core is faced with multi-layered laminated paper designed to check plaster slide and resist lath sag.

These gypsum bases are fabricated in thicknesses of 3/8", 1/2" and 5/8", and in seven different products for specific uses as listed below. All 16" and 24" widths comply with ASTM C37 and Federal Specification SS-L-30d, Type I. Veneer bases comply with ASTM C588.

Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40°—100° F); hygrometric coefficient of expansion (unrestrained): 5.4×10^{-6} in. per in. per % r.h. (5%—90% r.h.)

function

Noncombustible—When used with gypsum plaster, gypsum lath provides for fire-resistant construction (for ratings, see U.S.G. Construction Selector).

Strength—When securely attached, adds lateral stability to the assembly.

(continued on next page)

Sound Resistance—Gypsum lath partitions faced with gypsum plaster on both sides have high resistance to sound transmission; resilient attachment (page 8) further improves ratings (see U.S.G. Construction Selector).

Bonding—Gypsum plaster bonds to these bases with a safety factor far higher than required to meet usual construction standards.

Durability—Not harmfully affected by decay, dry rot or normal moisture; will not attract vermin.

Economy—The low cost, ease and speed of erection and savings in plastering are outstanding. ROCKLATH, IMPERIAL and USG R.H. plaster bases are made only by United States Gypsum.

Limitations

1. Maximum frame spacing is dependent on thickness and type of lath used (see table below).
2. Should be used with gypsum plaster only. Bond between lime or portland cement plaster and ROCKLATH is inadequate.
3. Gypsum lath and plaster, painted, has a vapor permeability of about $3\frac{3}{4}$ perms. For higher resistance to vapor transmission, Foil-Back ROCKLATH and IMPERIAL plaster base (see page 3) should be used.
4. Should not be used in areas exposed to excessive moisture



ROCKLATH Plaster Bases

for extended periods. USG galvanized metal lath and portland cement-lime plaster are recommended.

Regular ROCKLATH Plaster Base is recommended for nail or staple application to wood and nailable steel framing, for clip attachment to wood framing, steel studs and suspended metal grillage, and for screw attachment to USG metal studs and furring channels. Sizes: 16" x 48", $\frac{3}{8}$ " or $\frac{1}{2}$ " thick; 16" x 96", $\frac{3}{8}$ " thick (also made 16 $\frac{1}{5}$ " wide for Pacific Coast area).

Frame Spacing and Attachment—Gypsum Plaster Bases

framing	max. frame spacing c. to c.	attachment	fastener spacing c. to c.
$\frac{3}{8}$" ROCKLATH Plaster Base			
wood	16"	Nails—13 ga., $1\frac{1}{8}$ " long, $1\frac{1}{64}$ " flat head, blued	4 per 16" width of lath
		Staples—16 ga. galv. flattened wire, flat crown $\frac{7}{16}$ " wide, $\frac{3}{8}$ " divergent legs	
USG metal stud	16" or 24" [†]	R-1 & R-2 Clips	1 per 16"
		Screws—USG $\frac{3}{8}$ " Type S	2 per 16"
TRUSSTEEL stud	16"	Clips—Field Clip MS-1	16" along stud
		TL-1 clips	
metal nailing stud	16"	TR-1 resilient clips (& accessories)	16" along stud
		Nail or staple as recommended by stud manufacturer	4 per 16" width
$\frac{3}{4}$ " channel	16"	BRACE-TITE clips (& accessories)	1 per 16" width
USG metal furring channel	16"	USG 1" Screws, Type S	3 per 16" width, 1" from edges & center

framing	max. frame spacing c. to c.	attachment	fastener spacing c. to c.
$\frac{1}{2}$" ROCKLATH Plaster Base			
wood	24"	Nails—13 ga., $1\frac{1}{8}$ " long, $1\frac{1}{64}$ " flat head, blued	5 per 16" width of lath
		Staples—16 ga. galv. flattened wire, flat crown $\frac{7}{16}$ " wide, 1" divergent legs	

framing	max. frame spacing c. to c.	attachment	fastener spacing c. to c.
$\frac{1}{2}$" USG R.H. Base			
wood joists	16"	Nails— $1\frac{1}{4}$ " 13 ga., $1\frac{1}{64}$ " head, ring or barbed shank, blued, bright, or cem. ctd.	7" ceilings
		Screws—USG $1\frac{1}{4}$ " Type W	12"
RC-1 resil. channel	16"	Nails for FIRECODE lath— $1\frac{1}{8}$ " 5d cooler type—cem. ctd.	6" ceilings 7" walls
		Screws—USG Brand $\frac{3}{8}$ " or $1\frac{1}{16}$ " Type S†	12" or 16" [†]
USG metal stud	16"	Screws—USG 1" Type S for plaster base to channel; $1\frac{1}{4}$ " Type W or S for channel to wood framing, $\frac{3}{4}$ " Type T to TRUSSTEEL Studs	12"

framing	max. frame spacing c. to c.	attachment	fastener spacing c. to c.
$\frac{1}{2}$" USG R.H. Base			
wood	16" or 24" [†]	Nails— $1\frac{1}{4}$ " 13 ga., $1\frac{1}{64}$ " head, ring or barbed shank, blued, bright, or cem. ctd.	7" ceilings 8" walls
		Screws—USG $1\frac{1}{4}$ " Type W	12"
USG metal stud	16" or 24" [†]	Nails for FIRECODE lath— $1\frac{1}{8}$ " 5d cooler type—cem. ctd.	6" ceilings 7" walls
		Screws—USG Brand 1" or $1\frac{1}{8}$ " Type S	12" or 16" [†]
RC-1 resil. channel	16" or 24" [†] o.c.	Screws—USG 1" Type S for plaster base to channel; $1\frac{1}{4}$ " Type W or S for channel to wood framing, $\frac{3}{4}$ " Type T to TRUSSTEEL Studs	12"

framing	max. frame spacing c. to c.	attachment	fastener spacing c. to c.
$\frac{1}{2}$" IMPERIAL Plaster Base			
wood	16"	Nails— $1\frac{1}{4}$ " 13 ga., $1\frac{1}{64}$ " head, ring or barbed shank, blued, bright, or cem. ctd.	7" ceilings 8" walls
		Screws—USG $1\frac{1}{4}$ " Type W	12"
USG metal stud	16"	Nails for FIRECODE lath— $1\frac{1}{8}$ " 5d cooler type—cem. ctd.	6" ceilings 7" walls
		Screws—USG Brand $\frac{3}{8}$ " or $1\frac{1}{16}$ " Type S†	12" or 16" [†]
RC-1 resil. or furring channel	16"	Screws—USG 1" Type S for plaster base to channel; $1\frac{1}{4}$ " Type W or S for channel to wood framing, $\frac{3}{4}$ " Type T to TRUSSTEEL Studs	12"

[†]3-coat plastering required with 24" stud spacings ^{††}16" for double-layer application.

[†]2-coat plastering required with single layer on 24" spacing.

ROCKLATH FIRECODE Plaster Base is a gypsum lath which combines all the advantages of Regular ROCKLATH with additional resistance to fire exposure—the result of a specially formulated core containing special mineral materials. Size: nom. 16" x 48", $\frac{3}{8}$ " thick.

Long Length ROCKLATH Plaster Base is manufactured for use in constructions requiring floor-to-ceiling-height lath, such as the Solid ROCKLATH and Plaster Partition System and the USG Exterior Wall Furring System. Sizes: 24" wide, $\frac{3}{8}$ " thick with square edges, $\frac{1}{2}$ " thick with "V" edges, lengths mill cut as required up to 12 ft.

Foil-Back ROCKLATH Plaster Base offers all the advantages of Regular ROCKLATH as a rigid plaster base, is made in the same sizes, but has bright aluminum foil laminated to the back side. This creates an effective vapor barrier at no additional labor cost. Its vapor permeability of 0.67 perms is well below the 1.00 perm limit permissible under HUD requirements. In addition, Foil-Back ROCKLATH provides positive insulation value when installed with the foil facing a $\frac{3}{4}$ " minimum air space. When used as a ceiling, under winter heating conditions its resistance value is 2.69; in retarding downward heat flow in summer, its effectiveness is nearly doubled to a resistance value of 4.88 including air space (see table below). Corrosion and normal dust accumulation exert negligible effect on the vapor barrier and insulation characteristics of Foil-Back ROCKLATH.

Long Length Foil-Back ROCKLATH, also with aluminum foil laminated to the back side, is used primarily for furring exterior masonry walls. Sizes: 24" wide, $\frac{3}{8}$ " thick, lengths mill cut required up to 12 ft.; formed with square edges. Thermal resistance values of Foil-Back ROCKLATH are as follows:

Surface, Heat Flow & Season			Foil-Back ROCKLATH	
			$\frac{3}{8}$ "	$\frac{1}{2}$ "
horizontal	(up)	winter	2.69	2.82
horizontal	(dn)	summer	4.88	5.01
vertical	(hor)	winter	3.89	4.02
vertical	(hor)	summer	3.89	4.02

Note: Resistances are based on still air film, $\frac{1}{2}$ " sanded plaster, and lath with one reflective surface facing a $\frac{3}{4}$ " min. still air space.

IMPERIAL Plaster Base is a special gypsum lath in large sheet form, with strength and absorption characteristics designed for use with IMPERIAL Plasters (see Folder SA-918). Available in Regular, FIRECODE and FIRECODE "C" core and Foil-Back 48" wide, $\frac{1}{2}$ " or $\frac{3}{8}$ " thick, 8 to 12-ft. lengths. FIRECODE and FIRECODE "C" types have fire-rated cores which add fire protection and are listed by U.L., Inc. under Label Service.

The $\frac{1}{16}$ " to $\frac{3}{32}$ " plaster thickness is applied after joints have been treated with IMPERIAL glass fiber lino-weave tape. USG No. 900 corner bead is used. Using the FIRECODE "C" base, the system qualifies for ratings of up to two hours and 53 STC in metal frame (see Folder SA-912) and in wood frame assemblies (see Folder SA-913).

USG R.H. Base is a specially fortified large-size gypsum lath, used with RED TOP Radiant Heat Plasters in electric cable ceilings. Available 48" wide, regular $\frac{1}{2}$ " or $\frac{3}{8}$ " thick, FIRECODE $\frac{1}{2}$ " thick, 8 to 12-ft. lengths. Nailed or screw-applied to wood joists; screw-applied to USG metal furring channels or RC-1 resilient channels; joints reinforced with $2\frac{1}{2}$ " wide IMPERIAL glass fiber tape. System (see U.S.G. Bulletin P-480) improves heat emission and resistance to heat deterioration.



IMPERIAL Plaster Base applied over RC-1 Resilient Channels offers excellent sound control.

2. USG Metal Lath

description

USG metal lath is sheet steel that has been slit and expanded to form a multitude of small mesh openings. It is made in Diamond Mesh, Riblath and Stuccomesh types and in two different weights for each style. All are manufactured from rust-resisting copper alloy steel, further protected by a coating of black asphaltum paint. Certain types are also available in galvanized steel (see page 4). They comply with Federal Specification QQ-L-101c.

function

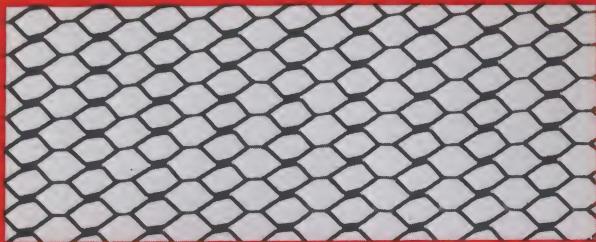
Strength—Metal lath embedded within the plaster provides strength in a manner similar to steel reinforcement in concrete slabs, thus offering high resistance to transverse impact. It decreases the hazards of serious cracks and failures due to structural movement of the frame.

Flexibility—Readily shaped to ornamental contours to a degree not possible with other plaster bases.

Quality Work—The manner in which metal lath accepts



Plaster keys to metal lath for high resistance to cracking.



USG Junior Diamond Mesh Lath



USG 4-Mesh Z-Riblath



USG 5/8" Riblath



USG 3/4" Riblath



USG Self-Furring Diamond Mesh Lath



USG Poly-Backed Metal Lath

plaster makes the use of over-aggregated plaster in the scratch coat impractical.

Fire Resistance—Metal lath and gypsum plaster provide fire ratings up to 4 hours (see U.S.G. Construction Selector).

Identification—Ends of bundles of USG Metal Lath are spray painted in different colors for various weights, thus simplifying inspection at the job site.

USG Junior Diamond Mesh Lath is a small diamond mesh metal plaster base (approx. 11,000 meshes per sq. yd.). A general all-purpose lath, best for ornamental, contour plastering. The small meshes conserve plaster and reduce droppings. Available painted and galvanized.

Also available in self-furring type having $\frac{1}{4}$ " "dimple" indentations spaced $1\frac{1}{2}$ " o.c. each way for use as exterior stucco base, column fireproofing and for replastering over old surfaces. **Size:** 27" x 96". **Weights:** 2.5 lbs. (end painted white) and 3.4 lbs. (end painted red) per sq. yd.

USG Poly-Backed Metal Lath is galvanized Junior Diamond Mesh Lath with 1-mil clear polyethylene factory-bonded to the back. It is ideal for machine-applied stucco in curtain walls and for plaster in interior partitions. **Size:** 27" x 96". **Weight:** 3.4 lbs. per sq. yd.

USG 4-Mesh Z-Riblath is a "flat rib" type of lath with smaller mesh openings, suitable for "double-up" type of plastering. An excellent nail-on lath, or for tie-on work on flat ceilings. **Size:** 27" x 96". **Weights:** 2.75 lbs. (end painted white) and 3.4 lbs. (end painted red) per sq. yd. **Limitation:** not for contour or resilient work; Diamond Mesh preferred.

USG 5/8" Riblath comes in a herringbone mesh pattern with $\frac{5}{8}$ " V-shaped ribs running lengthwise of the sheet at $4\frac{1}{2}$ " intervals, with inverted intermediate $\frac{3}{16}$ " ribs. The heavy ribs provide exceptional rigidity. Used when supports are spaced more than 16" o.c. and for 2" solid studless metal lath and plaster partitions. Also used as a centering lath for concrete floor and roof slabs. Available painted and galvanized. **Size:** 27"x 96" (other lengths available). **Weights:** 3.4 lbs. (end painted red) and 4.0 lbs. (end painted yellow) per sq. yd. **Limitation:** its extreme rigidity makes $\frac{5}{8}$ " Riblath unsuitable for contour plastering or resilient application—use Diamond Mesh Lath; due to $\frac{5}{8}$ " rib, minimum ground thickness must be 1".

USG 3/4" Riblath provides a herringbone mesh pattern with $\frac{3}{4}$ " deep V-shaped ribs lengthwise of the lath at 6" intervals. It is a structural lath, providing the dual functions of centering and reinforcement for concrete floor and roof slabs. **Sizes:** 2 x 8, 2 x 10 and 2 x 12 ft. **Weights:** .60 lb. and .75 lb. per sq. ft. **Limitation:** not recommended as a plastering lath.

USG Expanded Metal Stuccomesh is a $1\frac{3}{8}$ " x $3\frac{1}{8}$ " diamond mesh pattern designed as a base for exterior stucco, hand or pump applied. **Size:** 48" x 99". **Weights:** 1.8 lbs. and 3.6 lbs. per sq. yd. **Limitations:** should be applied with $1\frac{1}{2}$ " galvanized self-furring nails; when used over sheathing other than wood, fasten with longer nails providing minimum penetration of $1\frac{1}{8}$ " into studs.

**Types and Weights of USG Metal Lath
and Spacing of Supports**

type of lath (1)	weight per sq. yd.	size sheets	maximum allowable spacings			
			vertical supports		horizontal supports	
			wood	metal	wood or concrete	metal
Diamond Mesh (2)	2.5 lb.	27" x 96"	16"	16"	(4)	(4)
Diamond Mesh (2)	3.4 lb.	27" x 96"	16"	16"	16"	16"
1/8" Z-Rib	2.75 lb.	27" x 96"	16"	16"	16"	12"
1/8" Z-Rib	3.4 lb.	27" x 96"	19"	24"	19"	19"
3/8" Rib (2)	3.4 lb.	27" x 96"	24"	24"	24"	24"
3/8" Rib (2)	4.0 lb.	27" x 96"	24"	24"	24"	24"
Stuccomesh (3)	1.8 lb.	48" x 99"	16"(3)			
Stuccomesh	3.6 lb.	48" x 99"	16"(3)			
		per sq. ft.	2' x 8' 2' x 10' 2' x 12'			
3/4" Riblath	0.60 lb. 0.75 lb.					

Notes: (1) All types made from copper alloy steel containing from 0.20% to 0.25% pure copper, and painted with rust-inhibitive black asphaltum paint. (2) Available in both copper alloy painted and galvanized steel. (3) Generally applied over exterior sheathing. (4) Not recommended except for fireproofing of steel shapes. (5) Including vertical furring.


PYROBAR Partition Tile
Attachment—USG Metal Lath

framing	attachment	fastener spacing c. to c.
wood studs	Nails—4d common, driven to 3/4" penetration and bent over to engage 3 strands or through the rib	6"
	Nails—1" roofing nail 7/16" head, engaging 2 strands or through the rib	6"
	Staples—1", 14 ga. wire staples, engaging 2 strands or a rib	6"
wood joists	Nails—1 1/2", 11 ga. barbed roofing nail, 7/16" head, engaging 2 strands or a rib	6"
TRUSSTEEL studs	SUPER-TITE Clip—driven through chord wires	6"
steel studs, channels or rods	No. 18 ga. tie wire	6"
nailing studs or channels	Nail or staple as recommended by manufacturer of the member	6"
steel studs	USG Screws—1 1/4" Type S-12 for attaching self-furring lath in exterior curtain walls. Screw driven through gypsum sheathing into steel studs, to engage 2 strands	8"

Technical Data—PYROBAR Partition Tile

PYROBAR use	finished partition thickness	approx. wt. psf	limiting height*
2" solid, unplastered	2"	11	—
2" solid, plaster 1 side	2 1/8"	16	—
3" solid, unplastered	3"	16	13'
3" solid, plaster 1 side	3 1/8"	21	13'
3" hollow, unplastered	3"	11	13'
3" hollow, plaster 1 side	3 1/8"	16	13'
3" hollow, plaster 2 sides	4 1/4"	23	13'
4" hollow, plaster 1 side	4 1/8"	20	17'
4" hollow, plaster 2 sides	5 1/4"	26	17'
6" hollow, plaster 2 sides	7 1/4"	33	30'
3" hollow, res. clip 1 side, R/L-PI.	5"	23	13'
4" hollow, res. clip 1 side, R/L-PI.	6"	27	17'

*Based on L/360 deflection.

3. PYROBAR Gypsum Partition Tile
description

PYROBAR is a precast, kiln-dried gypsum tile for building non-load bearing fireproof partitions. It is made in 12" x 30" size, in four thicknesses with indented surfaces, in types as follows:

- 2" Solid, 3" Hollow for column & vent shaft fireproofing
- 3" Solid, 3" Hollow, 4" Hollow and 6" Hollow, all for partitions and column fireproofing

Complies with ASTM C52 and Fed. Spec. SS-T-316c.

function

Fire Resistance—PYROBAR provides the greatest fire protection per inch of thickness of any commercial partition assembly; fire ratings up to 4 hours (see U.S.G. Construction Selector).

Lightweight—30% to 50% lighter than other commonly used masonry units.

Economy—Fewer joints than with smaller masonry units; machine molded units lay accurately to form level surface, require less plaster and mortar than other types; easily cut, handled and maintained; ideal for tenant office renovations.

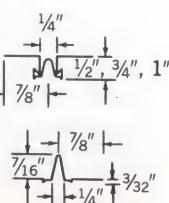
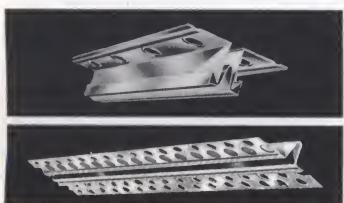
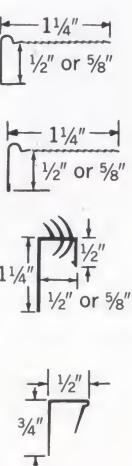
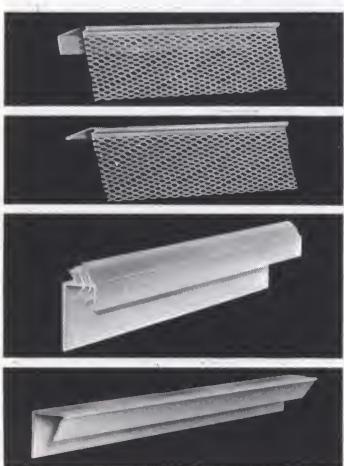
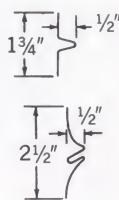
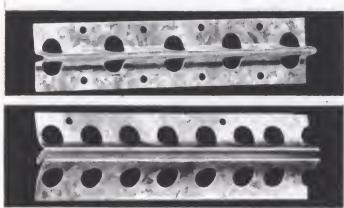
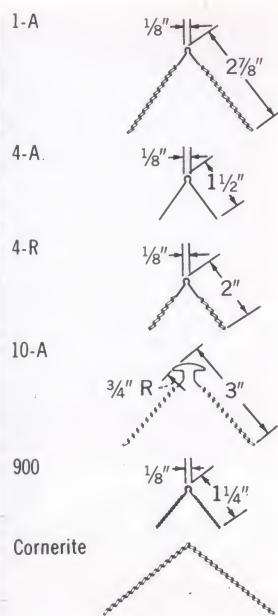
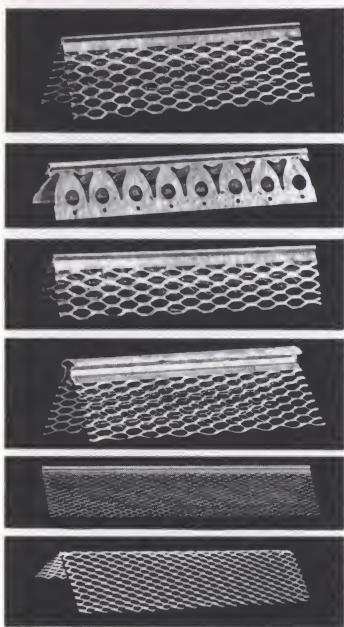
Plaster Bond—PYROBAR is the most compatible masonry plaster base for gypsum basecoat plasters.

Sound Resistance—Excellent sound transmission loss ratings when plastered two sides, further improved by resilient lath and plaster facing on one side (see U.S.G. Construction Selector).

For details of use in partition systems and column fireproofing, see U.S.G. Folder SA-405. Technical data appears in table at left.

limitations

1. For use only in non-load bearing constructions.
2. Portland cement and lime mortars do not bond adequately with PYROBAR. RED TOP Partition Tile Cement should be used.
3. Portland cement or lime plasters cannot be used over PYROBAR. RED TOP Gypsum Plaster should be used.
4. PYROBAR must be protected by a continuous coating of asphaltic material prior to any contact of wet flooring or base material with the face of the tile.



4. USG Corner Reinforcements, Screeds and Control Joints

description

USG Corner Beads and Screeds, made from top-quality 26-ga. galvanized steel, enjoy the industry's top acceptance because of their dependability and continual improvement in design. Corner beads are available in 7, 8, 9, 10 and 12-ft. lengths, screeds in 10-ft. lengths, casing beads (24-ga. galv. steel) in 7, 8 and 10-ft. lengths.

function

Protection—USG Corner Beads should be used on all external plaster corners to provide plaster protection, true and straight lines at corners, and grounds for plastering; USG Casing Beads around wall openings and at intersections of plaster with other finishes.

Control—USG Screeds are used to divide different types of plaster finishes and as a separation between plaster and a cement base, or as a permanent incombustible screed to control plaster thickness and alignment beneath the wood or other rigid base trim.

1-A Expanded Corner Bead has wide expanded flanges that are easily flexed. Preferred for irregular corners. Provides increased reinforcement close to nose of bead.

4-A Flexible Corner Bead is a general purpose corner bead, economical and most generally used. By snipping flanges, this bead may be bent to any curved design (for archways, telephone niches, etc.). Can be secured to corners with 9-A Corner Bead Clips attached to flanges.

4-R Expanded Corner Bead gives outstanding service with small nose and totally expanded 2" wide flanges designed to increase plaster keys and minimize corner cracking. A general purpose bead, suitable for straight or arched corners.

10-A Expanded Bull Nose Corner Bead is a bull nose bead similar to above, but with 2½" wide expanded flanges. Especially suitable on irregular corners.

900 Corner Bead serves dual purpose with either one- or two-coat IMPERIAL Plaster systems. Gives ½" grounds, and its 1¼" fine-mesh flange can be either stapled or nailed. Provides superior plaster key and eliminates shadowing.

Cornerite and Striplath are strips of painted copper alloy Diamond Mesh lath for reinforcement. Selv-edge Cornerite, bent lengthwise in the center to form a 100° angle, should be used in all internal plaster angles where metal lath is not lapped or carried around; over non-ferrous lath anchored to the lath; and over internal angles of masonry constructions. Its use is optional in Resilient ROCKLATH lathing systems (see U.S.G. Folders SA-405, SA-915); also used in the "Floating Angle" method of applying gypsum lath to wood framing members in order to reduce plaster cracking. Cornerite also available galvanized. Sizes: 2" x 2" x 96" and 3" x 3" x 96". Striplath is a similar flat strip, used as a plaster reinforcement over joints of non-metallic lathing bases and where dissimilar bases join; also to span pipe chases. Sizes: 4" x 96" and 6" x 96".

6-A Plain Base Screed is a flush type $\frac{1}{2}$ " ground (job shimmed for $\frac{3}{4}$ " grounds), used as a straight divider strip between different types of plaster, as between gypsum and portland cement.

8-A Picture Mould provides a concealed mould, attached to lath and plastered flush to the notch opening. Grounds $\frac{1}{2}$ " (job-shimmed for $\frac{3}{4}$ " grounds).

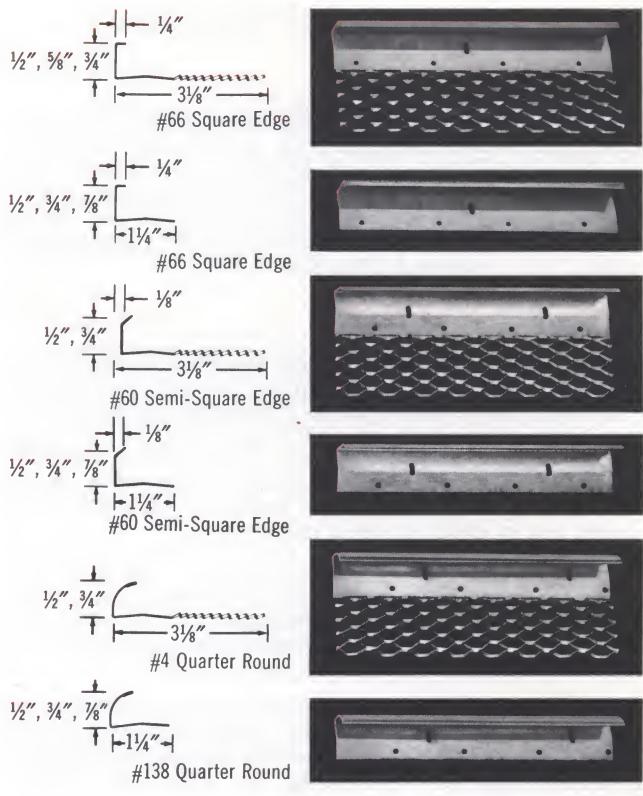
USG Metal Trim comes in two styles to provide neat edge protection for veneer plastering at cased openings and ceiling or wall intersections. Made of 29-ga. galvanized steel, both have expanded flanges to strengthen the plaster bond. They fit over $\frac{1}{2}$ " or $\frac{3}{8}$ " IMPERIAL Plaster Base, and provide $\frac{3}{16}$ " grounds for IMPERIAL Plasters. No. 701-A is channel-type casing nailed to door or window buck. No. 701-B is an angle edge trim used at junction of plaster base with rough concrete or masonry ceiling—attached by stapling when used with USG metal studs.

USG P-1 Vinyl Trim is a channel-shaped rigid trim with flexible vinyl fins which compress on installation to provide a positive acoustical seal comparable in performance to one bead of acoustical sealant. For IMPERIAL Plaster partition perimeters. Length: 8, 9 and 10 ft. Sizes: for $\frac{1}{2}$ " and $\frac{5}{8}$ " plaster base.

USG P-2 Vinyl Trim is a channel-shaped vinyl trim with a pressure-sensitive adhesive backing for attachment to the wall at wall-ceiling intersections. Provides positive perimeter relief in radiant heat and veneer plaster systems. Allow $\frac{1}{8}$ " to $\frac{1}{4}$ " clear space for insertion. Length: 10 ft.

USG Control Joint relieves stresses of expansion and contraction in large plastered areas. Made from roll-formed zinc, it is resistant to corrosion in both interior and exterior uses with gypsum or portland cement plaster. An open slot, $\frac{1}{4}$ " wide and $\frac{1}{2}$ " deep, is protected with plastic tape which is removed after plastering is completed. The perforated short flanges are wire-tied to metal lath or stapled to gypsum lath. Thus the plaster is key-locked to the control joint, which not only provides plastering grounds but can also be used to create decorative panel designs. Limitations: Where sound and/or fire ratings are prime considerations, adequate protection must be provided behind the control joint. USG Control Joints should not be used with magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives. Sizes and grounds: No. 50, $\frac{1}{2}$ "; No. 75, $\frac{3}{4}$ "; No. 100, 1" (for use with exterior stucco curtain walls)—all in 10-ft. lengths. For maximum spacing and specifications, see pertinent U.S.G. System Folders.

USG Control Joint No. 093 applies the same functions of the regular control joint (above) to IMPERIAL Veneer Plaster installations. Made of zinc, with $\frac{3}{16}$ " ground dimension and a tape-protected $\frac{1}{4}$ " opening $\frac{1}{16}$ " deep. Used from floor to ceiling in long partition runs, and from door header to ceiling. Lengths: 8 and 10 ft.



Casing Beads

USG Casing Beads are used as a plaster stop and as exposed trim around window and door openings; also recommended at junction or intersection of plaster and other wall or ceiling finishes. May be used with USG metal lath, ROCKLATH gypsum plaster base, or masonry construction. In order to insure proper grounds for plastering, $\frac{3}{4}$ " casing beads are recommended for use with metal lath, $\frac{5}{8}$ " beads with all masonry units, $\frac{7}{8}$ " beads when the flange is applied *under* ROCKLATH plaster base, $\frac{1}{2}$ " beads when the flange is applied *over* ROCKLATH. Lengths: 7, 8 and 10 ft.

IMPERIAL Tape is a special $2\frac{1}{2}$ " wide glass fiber lino-weave tape designed to reinforce joints of large-size IMPERIAL and USG R.H. bases prior to finishing with the veneer plasters of those systems. Open weave of tape allows rapid air escape during plaster embedding; highly crack resistant. Two types: P, pressure-sensitive, and S, staple-attached.



5. USG Lath Attachment Accessories

description

A complete line of specially formed steel clips and self-drilling steel screws is available to provide positive attachment and rapid erection of USG gypsum plaster bases and metal lath. Variations are designed for use with ten different U.S.G. partition and ceiling systems. Erection and specification are covered in individual U.S.G. System Folders, quantity requirements in the U.S.G. Lathing & Plastering Handbook.

function

- BRIDJOINT Clips** provide a rigid alignment of ROCKLATH plaster base where ends of lath do not fall on structural members, thus adding crack resistance at vulnerable points; **BRACE-TITE Clips**, of special wire, attach $\frac{3}{8}$ " ROCKLATH to metal ceiling grillages, exterior wall and beam furring channels; **TRUS-LOK Clips** attach $\frac{3}{8}$ " ROCKLATH to TRUSSTEEL Studs; **USG Bracing Clips** and **Ceiling Runner Clips** attach Long Length ROCKLATH to channels and runners.
- USG Resilient Clips** provide a non-rigid or floating attachment to $\frac{3}{8}$ " ROCKLATH plaster base and USG Metal Lath to the structural frame, thus affording increased protection against plaster cracking due to structural movement, and increased sound resistance.
- USG Brand Screws** are recommended for attachment of IMPERIAL and USG R.H. Plaster Bases to metal or wood framing; are also an alternative to MS-1 Clips in attachment of ROCKLATH to USG Steel Studs.

limitations

- Three-coat plastering is required on resiliently attached ROCKLATH ceilings.
- When used with BRACE-TITE Clips, maximum spacing of cold rolled channels is 16" o.c.

BRIDJOINT Field Clip B-1 is used to support and align end joints of ROCKLATH which do not fall opposite structural members; sizes for both $\frac{3}{8}$ " and $\frac{1}{2}$ " lath.

BRIDJOINT Corner Clip B-2 is used in conjunction with B-1 clips to eliminate nailing in corners and angles; also when ceilings are resilient and walls nailed direct and vice versa. For $\frac{3}{8}$ " ROCKLATH only.

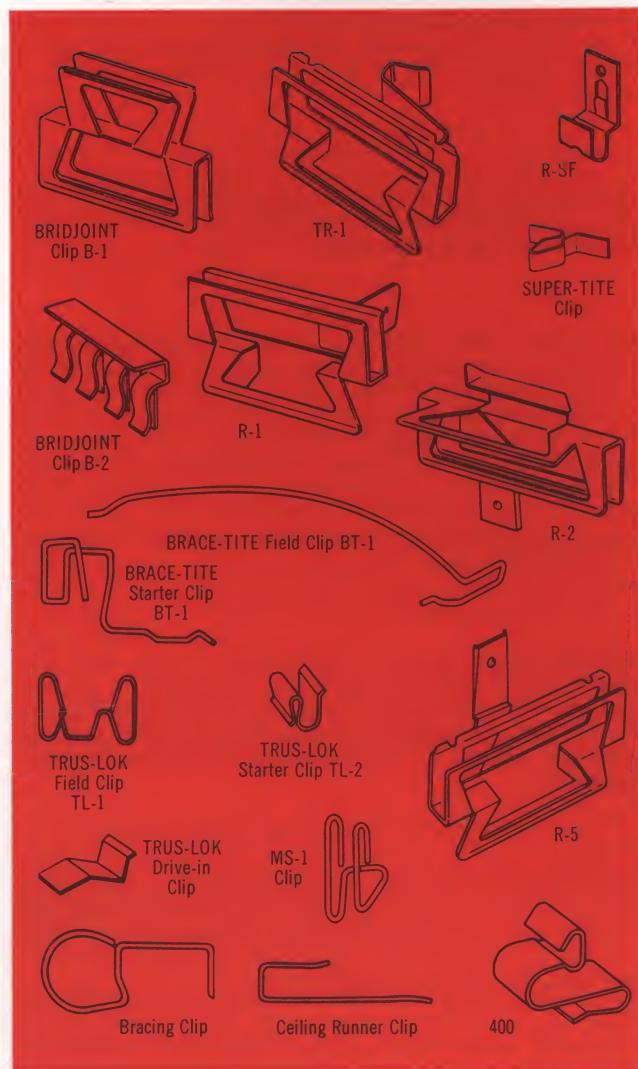
BRACE-TITE Field Clip BT-1 is used for suspended ceilings, exterior wall and beam furring and hollow pipe chase partitions. Designed to provide support across the full width of the lath; improved for easy installation. For use with standard $\frac{3}{4}$ " cold-rolled channels.

BRACE-TITE Starter Clip BT-1 is used in conjunction with BT-1 field clip to start first course of lath.

TRUS-LOK Field Clip TL-1 is designed for attaching $\frac{3}{8}$ " ROCKLATH to TRUSSTEEL Studs.

TRUS-LOK Starter Clip TL-2 is used with TL-1 clips, MS-1 clips and runner track to start first course of lath.

TRUS-LOK Drive-In Clip is used to anchor (1) bottom course of lath in direct attachment to TRUSSTEEL Studs or USG Steel



Studs, and (2) top course of lath in partitions to underside of monolithic concrete flat slab or concrete joist filler construction; also as starter-finisher clip in metal stud-ROCKLATH partition.

MS-1 Clip provides quick direct attachment of $\frac{3}{8}$ " ROCKLATH to channel-type USG Steel Studs. Clip is slipped behind stud flange and down over lath.

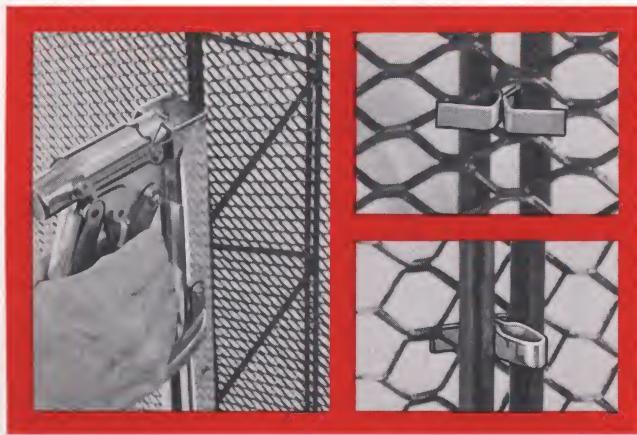
USG Bracing Clip is provided for attaching $\frac{3}{4}$ " channels to $\frac{1}{2}$ " long length ROCKLATH as temporary braces in 2" solid ROCKLATH and plaster partition construction.

Ceiling Runner Clips are used for attaching $\frac{1}{2}$ " Long Length ROCKLATH to "L" shaped ceiling runners.

Resilient Clip TR-1 attaches $\frac{3}{8}$ " ROCKLATH to TRUSSTEEL Studs spaced 16" o.c., furs lath $\frac{3}{8}$ " from stud face.

Resilient Starter-Finisher Clip R-SF is used with starting and last courses of resiliently attached ROCKLATH Plaster Base on wood studs or TRUSSTEEL snap-in runner track.

SUPER-TITE Clip, applied with a special gun, firmly attaches diamond mesh lath to TRUSSTEEL Studs (see page 9).



Metal lath application with SUPER-TITE Clip

Resilient Clip R-1, for wood studs or joists spaced 16" o.c., is attached by nailing with 13-ga., 1½" lathing nail. ROCKLATH is floated ¾" free of framing members and held in place by the prongs of the clip.

Resilient Clip R-2 is for internal angles of wood frame construction when both surfaces are resiliently furred. Furs lath ¾" from framing.

Resilient Clip R-5 is for masonry walls or face attachment over sound deadening board. ROCKLATH is resiliently furred ½" from face.

Resilient Clip No. 400 is snapped in place, 16" o.c., over the outer flanges of TRUSSTEEL Studs. ¼" pencil rod is snapped into the protruding tongue of the resilient clip, and metal lath wire-tied in place ½" from stud face.

USG Brand Screws are recommended for attachment of large-size IMPERIAL and USG R.H. Base, as well as of ROCKLATH Plaster Base in certain applications. Twenty-five different self-drilling, self-tapping steel screws are used in plastering systems, applied by power-driven screw gun. They comply with ASTM C646. Applications are listed below.

USG Brand Screws—size & type	fastening applications
⅜", 1", 1½" and 1¾" Type S—Bugle Head	Single and double-layer IMPERIAL Base to steel studs, metal furring; (1" screw only) IMPERIAL and USG R.H. Bases to RC-1 Resilient Channel
1¼", 1½" & 2¼" Type S—Bugle Head	Core units and face-layer IMPERIAL Base to steel runners in caged beam fireproofing
1", 1¼", 1½", 1¾", 2¾" and 2½" Type S-12—Bugle Head	Metal lath, gypsum sheathing and IMPERIAL Base to 20-ga. steel studs in curtain wall assemblies
1¾" & 2¼" Type S—Trim Head	Wood trim over single and double-layer IMPERIAL Base to steel studs and runners
¾" Type S—Pan Head—Hex Washer Head	Steel studs to steel runners
¾", ½" Type S-12—Pan Head	Steel studs to metal door frame
1¼", 1½", 2¾" Type S—Oval Head	Cabinets to steel studs and RC-1 Resil. Channel
1¼" Type W or S—Bugle Head	Single-layer IMPERIAL and USG R.H. Bases to wood framing; RC-1 Channels to wood framing
1½" Type G—Bugle Head	Face-layer IMPERIAL Base to base-layer IMPERIAL Base in laminated partitions
¾" Type T—Pan Head	RC-1 Resil. Channel to TRUSSTEEL Studs

6. USG Structural Accessories

description

U.S.G. leads the industry in the development and acceptance of structural components for plastering systems. All are noncombustible, made from galvanized steel or rods. Included are non-load bearing studs of the truss and channel types, complete with runner tracks, shoes and screws as needed; hat-shaped and U-shaped furring and lathing channels, and an adjustable wall furring bracket.

function

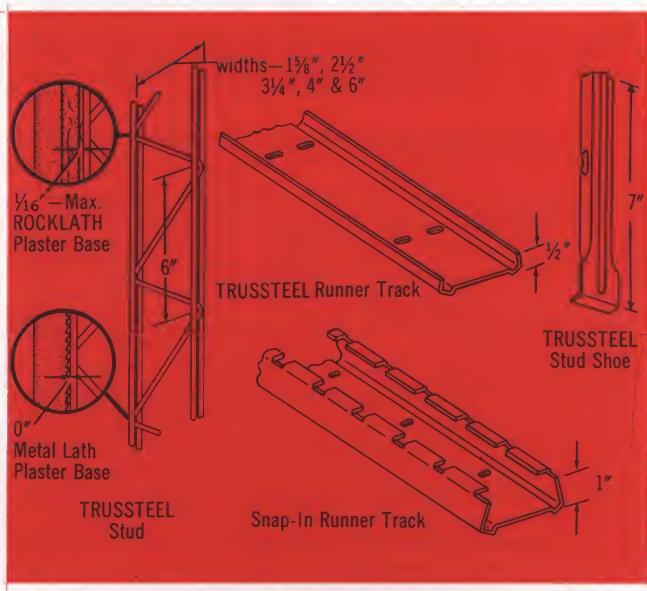
Designed for use with both USG gypsum plaster bases and metal lath, these accessories provide established fire ratings and improved sound transmission loss (see U.S.G. Construction Selector). Other advantages are light weight, low material cost and quick erection, superior strength, and versatility in meeting job requirements.

Details, specifications, limiting heights and spacing are covered in pertinent U.S.G. System Folders.

TRUSSTEEL Studs are the original open truss design studs for the erection of hollow, fire-resistant partitions. The strongest non-load bearing studs on the market, they are formed from cold drawn 7-ga. steel wire rods with tensile strength of 90,000 psi—substantially higher than hot-rolled sheets from which pressed metal and edge angle studs are formed.

Made with a continuous diagonal wire web welded to double wire flanges, TRUSSTEEL Studs are fabricated in five stud widths: 1½", 2½", 3¼", 4" and 6", factory-cut to job lengths. The open-web design readily accommodates pipes, conduits and ducts (see table page 10) without impairing the strength of the partition assembly. This engineered member, together with its accessories (below) provides a framework for easy direct or resilient attachment of metal lath, IMPERIAL or ROCKLATH plaster base—the best sound isolation partition systems in the industry and the most economical.

TRUSSTEEL Snap-In Runner Track anchors the TRUSSTEEL Stud partition to the floor. Attachment of stud to track is by a snap-in feature, eliminating the need for stud shoes. When the track serves as a ceiling runner, however, stud shoes are used if a fire rating is required. Available for all except the 6" width of TRUSSTEEL Studs; 8-ft. lengths.



TRUSSTEEL Runner Track is used in conjunction with TRUSSTEEL stud shoes to anchor the partition to the floor or ceiling, particularly where there is considerable floor-to-ceiling height variation. Available for all widths of TRUSSTEEL Studs; 8' lengths. Where top track is attached to suspended or furred framing, 1" tapping screws are used to anchor top course of lath into web wires of studs.

TRUSSTEEL Stud Shoes, 7" long, are used for connecting studs to runner track and permit up to a 4" adjustment in partition height. In 20-ga. (for curtain wall) or 24-ga. steel.

Design Data—TRUSSTEEL Studs

stud size—(widths)	1½"	2½"	3¼"	4"	6"
weight—(lbs. per 1000 ft.)	440	455	470	485	515
deflection(1)	.355"	.168"	.117"	.094"	.072"
gauge	7-ga. (diameter .177) chords and diagonals				
tensile strength	85,000 psi—yield point				
percent of open area	67%	79%	84%	87%	91%

(1)Deflections of TRUSSTEEL Studs with 100-lb. concentrated load in a 5-ft. span are below the maximum allowable deflections of .20" for 2½" studs, .15" for 3¼" studs, and .10" for 4" and wider studs specified in the requirements of the United States Corps of Engineers, General Services Administration, and Veterans Administration.

Structural Properties—TRUSSTEEL Studs

stud size	major axis			minor axis		
	I _x in ⁴	S _x in ³	r _x in	I _y in ⁴	S _y in ³	r _y in
1½"	0.052	0.064	0.725	.0033	.0123	.1824
2½"	0.132	0.106	1.162	.0033	.0123	.1824
3¼"	0.231	0.142	1.537	.0033	.0123	.1824
4"	0.365	0.183	1.916	.0033	.0123	.1824
6"	0.831	0.277	2.912	.0033	.0123	.1824

20-ga. USG Steel Studs and Runners, channel-type and roll-formed from galvanized steel, are used in non-load bearing exterior curtain wall systems. Available in four widths—2½", 3⅝", 4", 6"—studs in lengths up to 28 ft.; runners (with 1" unhemmed leg) in 10 and 12-ft. lengths. Products comply with Federal Specifications QQS-698 and QQS-775d, Class d. For height limitations, see System Folder SA-805.

Structural Properties—20-ga. USG Steel Studs

Y — X— X— Y	stud	I _x in ⁴	S _x in ³	R _x in	I _y in ⁴	S _y in ³	R _y in
	2½"	0.210	0.164	1.012	0.052	0.055	0.507
	3⅝"	0.497	0.269	1.422	0.056	0.056	0.493
4"	0.626	0.307	1.553	0.057	0.056	0.487	
6"	0.864	0.396	2.076	0.060	0.057	0.463	

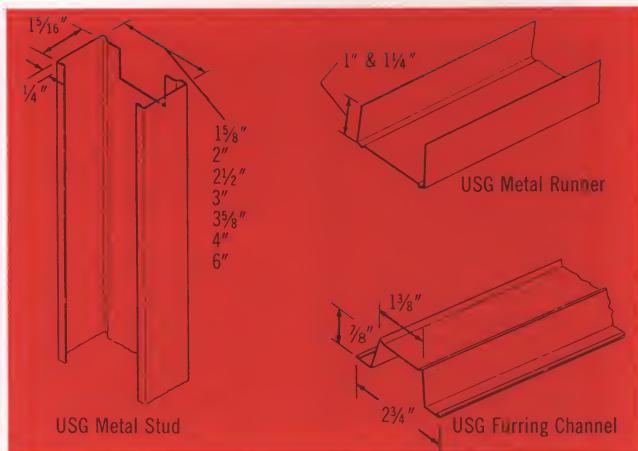
Physical Properties—20-ga. USG Steel Studs

A	dimension				metal thickness T*	net area sq. in.**	wt. lb. per lin. ft.
	B	C	D	T			
2½"	1.250	1.406	0.438	0.0359	0.205	0.760	
3⅝"	1.250	1.406	0.438	0.0359	0.245	0.920	
4"	1.250	1.406	0.438	0.0359	0.259	0.960	
6"	1.250	1.406	0.438	0.0359	0.331	1.230	

*Excluding galvanized coating

**Including galvanized coating

USG Steel Studs are non-load bearing channel-type members in seven widths—1½", 2", 2½", 3", 3⅝", 4" and 6"—roll-formed from galvanized steel. The secure rigid screw or clip attachment of the plaster base utilizes the full structural contribution of the lath and plaster membrane. Limited chaseways are provided by punchouts in the web. Studs may be overlapped and spliced by means of screws or wire ties. Partitions using these studs are low in cost with excellent



sound and fire resistance characteristics. Comply with ASTM C645. See Folder SA-912 for limiting heights.

Structural Properties—USG Standard Steel Studs

USG stud designation	width	I in ⁴ x-x	S in ³ x-x	R in x-x
158ST5	1 1/8"	0.043	0.047	0.689
20ST5	2"	0.069	0.062	0.837
212ST5	2 1/2"	0.115	0.082	1.028
30ST5	3"	0.174	0.105	1.213
358ST5	3 5/8"	0.269	0.135	1.304
40ST5	4"	0.338	0.154	1.316
60ST5	6"	0.324	0.146	1.481

USG Steel Runner is supplied in the seven stud widths for use at floor and ceiling. The galvanized steel track also functions as a header over metal door and borrowed-light frames.

USG Metal Furring Channel is a roll-formed hat-shaped section of galvanized steel. It may be attached with furring clips to the 1½" main carrying channel and spaced 16" o.c. for economical screw attachment of ROCKLATH as a base for either adhesively applied acoustical tile or a basecoat plaster; 4-foot span. The furring channel also provides noncombustible furring for exterior walls and may be spaced up to 24" o.c. Face width 1 1/8", depth 7/8".

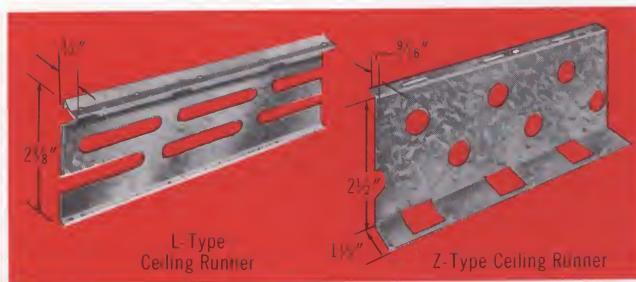
RC-1 SHEETROCK Resilient Channel is a galvanized steel channel for resilient attachment of IMPERIAL and USG R.H. Bases to wood framing, TRUSSTEEL studs or curtain wall framing. This is one of the most effective, lowest-cost methods of improving sound transmission loss through partitions and ceilings. Flange is prepunched for screw fastening to framing by USG 1 1/4" Type W or S Screw for wood frame or 3/4" Type T Screw for TRUSSTEEL Studs. Base is attached to channel by USG 1" Type S Screw. Channel is 2 3/4" wide x 1/2" in depth.



USG Z-Furring Channel is used to attach mineral-fiber insulation and IMPERIAL Plaster Base to masonry walls. Furring helps minimize effects of structural stresses; prevents wicking of moisture to inside surfaces. Made of hot-dipped galvanized steel. Easily applied with standard fasteners. Channel lengths: 8'6"; furring depth: 1"; flange widths: $\frac{3}{4}$ " and $1\frac{1}{4}$ ".

USG Adjustable Wall Furring Brackets are used for attaching $\frac{3}{4}$ " furring channels to exterior masonry walls. Made of 20-ga. galvanized steel with serrated edges, they are wire-tied to horizontal stiffeners, 24" o.c., in braced furring systems. Normal furring depth is $\frac{1}{4}$ " to $2\frac{1}{4}$ "; with USG Furring Channels, depth is increased by $\frac{1}{8}$ ".

USG Lathing Channels are cold-rolled from 16-ga. steel, black asphaltum painted; used for furring, suspended ceilings, partitions, and ornamental lathing. Sizes: $\frac{3}{4}$ ", 1", $1\frac{1}{2}$ ", 2". Lengths: 16 and 20 ft.



USG Ceiling and Floor Runners, of 26-ga. galvanized steel, two models: **L-Type Ceiling Runner** providing top anchorage for studless metal lath or ROCKLATH solid plaster partitions, 8-ft. lengths; **Z-Type Ceiling Runner** to anchor and align $\frac{3}{4}$ " channels in either solid partition construction or exterior wall furring, 10-ft. lengths.

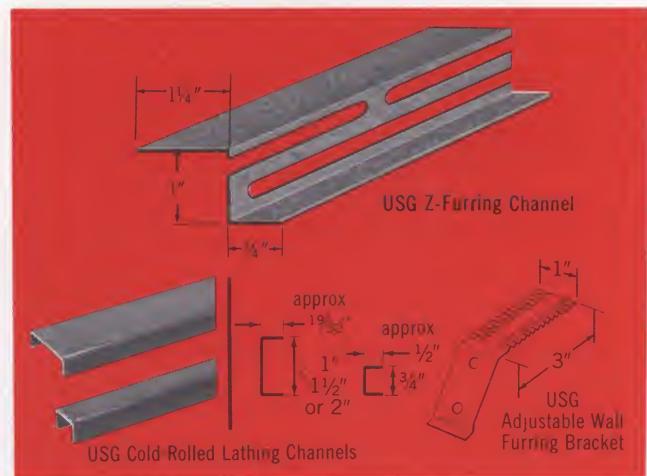
Size and Spacing of Main Runners

cold-rolled channel-size	approx. wt./1000 ft. (lbs.)	max. spacing of hangers along runners	max. c. to c. spacing of runners
$\frac{3}{4}$ "	300	2'	3'
$\frac{3}{4}$ "	300	3' (1)	2'-3"
$1\frac{1}{2}$ "	500	3'	4'
$1\frac{1}{2}$ "	500	3'-6"	3'-6"
$1\frac{1}{2}$ "	500	4'	3'
2"	590	5'	4'
2"	590	6'	2'-6"
2"	590	7'	2'

(1) For concrete joist construction only.

Size and Spacing of Cross Furring Members

spacing of supports	channel size	approx. wt. 1000 ft. (lbs.)	max. c. to c. spacing of cross furring
3'-0"	$\frac{3}{4}$ "	300	24"
3'-6"	$\frac{3}{4}$ "	300	19"
4'-0"	$\frac{3}{4}$ "	300	16"



general lathing specifications

notes to architect

The following recommendations and specifications are minimum basic guides for preparation of job specifications. They are for normal construction and are not intended to cover every possible design or job condition.

Detailed specifications for the various systems are provided in pertinent U.S.G. System Folders.

Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

Part 1: general

1.1 scope—Specify areas to receive this treatment.

1.2 qualifications

All materials shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before lath installation. Ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. Plaster Base: (ROCKLATH Gypsum Plaster Base (thickness), (regular), (FIRECODE), (Long Length), (Foil-Back).) (IMPERIAL Plaster Base (thickness), (Regular) (FIRECODE) (FIRECODE "C").) Specify only with IMPERIAL Plaster, #900 Corner Bead and IMPERIAL Joint Reinforcement Tape.

(USG R.H. Base (thickness).) Specify only with RED TOP Radiant Heat Plaster and IMPERIAL Joint Reinforcement Tape.

(USG Metal Lath (weight), (Junior Diamond Mesh) (USG Poly-Backed Metal Lath) (Z-Riblath) ($\frac{3}{8}$ " Riblath) ($\frac{3}{4}$ " Riblath) (Expanded Metal Stuccomesh).)

(PYROBAR Gypsum Partition Tile (thickness), (hollow) (solid) used with RED TOP Partition Tile Cement.)

b. Reinforcement: (USG 1-A, 4-A, 4-R, 10-A, #900 Corner Bead, Cornerite, Striplath.)

c. Screed: (USG 6-A Base Screed; 8-A Picture Mould.)

d. Control Joint: USG Control Joint (#50, #75, #100 or #093).

e. **Casing Bead:** (size) #4, #138, #60 or #66 USG Casing Bead (or USG Metal Trim 701-A and 701-B).

f. **Lath Attachment Clips:** (BRIDJOINT Clip B-1 or B-2; BRACE-TITE Field Clip or Starter Clip BT-1; TRUS-LOK Field Clip TL-1, Starter Clip TL-2, Drive-In Clip TL; Field Clip MS-1; SUPER-TITE Clip; USG Bracing Clip; USG Ceiling Runner Clip; USG Resilient Clip TR-1, R-SF, R-1, R-2, R-5, or #400).

g. **Screws:** ($\frac{1}{8}$ ", 1", $1\frac{1}{4}$ ", $1\frac{5}{16}$ ", $1\frac{3}{8}$ ", $2\frac{1}{4}$ ", $2\frac{3}{8}$ " or $2\frac{5}{8}$ " USG Brand Type S or S-12, Bugle Head) ($1\frac{5}{8}$ " or $2\frac{1}{4}$ " USG Brand Type S, Trim Head) ($\frac{3}{8}$ " USG Brand Type S Pan Head or Hex Washer Head) ($\frac{3}{8}$ " or $\frac{1}{2}$ " USG Brand Type S-12 Pan Head) ($1\frac{1}{4}$ ", $1\frac{3}{8}$ " or $2\frac{1}{4}$ " USG Brand Type S Oval Head) ($1\frac{1}{4}$ " USG Brand Type W) ($1\frac{1}{2}$ " USG Brand Type G) ($\frac{3}{4}$ " USG Brand Type T).

h. **Runners:** (USG L-Type) (USG Z-Type Ceiling Runner).

i. **Furring Channels:** (USG Metal Furring Channels) (USG Z-Furring Channels).

j. **Steel Studs:** (size) (TRUSSTEEL Studs, used with TRUSSTEEL Snap-In or TRUSSTEEL Runner Track, TRUSSTEEL Stud Shoes) (USG Steel Studs, used with USG Steel Runner).

k. **Furring Brackets:** USG Adjustable Wall Furring Brackets.

l. **Lathing Channels:** USG Lathing Channels.

m. **Resilient Channels:** RC-1 SHEETROCK Resilient Channels.

Part 3: execution

3.1 grounds—Set grounds by means of (pre-applied plasterribbons) (mechanical beads or screed) to provide the following minimum thickness of plaster over face of plaster base, including $\frac{1}{16}$ " finish:

$\frac{1}{16}$ " to $\frac{3}{32}$ " on IMPERIAL plaster base

$\frac{1}{4}$ " on USG R.H. base

$\frac{1}{2}$ " on ROCKLATH plaster base

$\frac{5}{8}$ " on metal lath, measured from face of lath

$\frac{5}{8}$ " on masonry base

$\frac{3}{4}$ " on Long Length ROCKLATH used for 2" Solid Partitions or Exterior Wall Furring

Note: Greater thickness may be required for fire-rated construction.

3.2 attachment of ROCKLATH plaster base

(See Folders SA-805, SA-915)

3.3 attachment of IMPERIAL plaster base

(See Folders SA-912, SA-913, SA-915, SA-922)

3.4 attachment of USG metal lath

(See Folders SA-805, SA-914)

3.5 erection of PYROBAR gypsum partition tile

(See Folder SA-405)

3.6 lathing for handball courts

a. **Masonry Back-up** as a plaster base shall be PYROBAR gypsum tile, monolithic concrete, clay tile or concrete block. Lay up with a full mortar bed, full end joint and with a running bond. Cut mortar joints flush with surface. Reinforce horizontal joints at third courses.

Erect PYROBAR Tile with RED TOP Partition Tile Cement. Coat clay tile and monolithic concrete surfaces with a quality bonding agent, applied per manufacturer's directions.

b. **Walls Subjected to Heavy Impact**—provide a reinforcing grid using $\frac{1}{4}$ " round rods spaced 24" o.c., supported in place by USG Adjustable Wall Furring Brackets spaced 36" o.c. To this grid securely wire-tie 3.6-lb. USG Expanded Metal Stuccomesh, held $\frac{7}{8}$ " away from face of masonry.

c. **Walls Not Subjected to Heavy Impact**—lath with (1) 3.6-lb. USG Self-Furring Stuccomesh, applied with galvanized self-furring nails, or (2) 3.4-lb. USG Self-Furring Metal Lath.

d. **Ceilings**—use ROCKLATH-BRACE-TITE construction with metal reinforcement added at all corners of recessed light openings or grilles. Place 6" x 12" metal lath reinforcement diagonally across corners and staple in place.

e. **Internal Angles and Wall-Floor Juncture**—attach USG #66 Casing Bead to face of metal lath. Coat bead with a quality bonding agent. (For plastering specifications, see U.S.G. Folder SA-918.)

3.7 control joint installation

Where indicated on drawings, attach USG Control Joints (size) with Bostitch $\frac{9}{16}$ " "G" staples or equal spaced not over 6" apart in each flange. (Control Joints Nos. 50, 75, 100—splice ends together with 16-ga. tie wire inserted into openings in the key-lock sections.) (Control Joint No. 093—square-cut end joints, butt together and align for neat fit.) Remove protective tape after plastering.

a. **Interior Ceilings**—space control joints not exceeding () ft. in either direction and with the area of separated sections not exceeding () sq. ft. (see pertinent U.S.G. System Folders). Break lath behind control joints; where channel framing is used, also break the channels. Position control joints to intersect light fixtures, heating vents, air diffusers, etc.

b. **Interior Walls and Partitions**—space control joints maximum of 30 ft. apart; control joints may occur over door frames as indicated in drawings. When control joints are used in conjunction with PYROBAR Partition Tile, kerf the tile directly under the control joint, to a depth of $\frac{3}{4}$ ".

c. **Exterior Soffits of Gypsum Plaster**—space control joints not exceeding 25 ft. in either direction. Break lath and channel behind control joints. All other specifications listed above are applicable.

d. **Exterior Walls, Soffits and Canopies of Portland Cement Stucco**—space control joints not exceeding 10 ft. in either direction. Where there is an intersection of vertical and horizontal joints, use continuous horizontal joint and butt the vertical joint. Caulk splices and intersections exposed to the elements with a silicone rubber caulking cement. In soffits and canopies, break lath and channel behind control joints.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, ROCKLATH, FIRECODE, RED TOP, PYROBAR, BRIDJOINT, BRACE-TITE, SUPER-TITE, TRUS-LOK, TRUSSTEEL, SHEETROCK, DURABOND.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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description and utility

Four types of United States Gypsum plastering products are covered in this catalog: (1) Basecoat Plasters, (2) Finish Coat, Gauging and Ornamental Plasters and Finishing Limes, (3) Veneer Plasters, (4) Special Plasters.

Functions, properties and limitations are treated within each group. A general plastering specification appears on pages 6 to 8. For product coverages, see the U.S.G. Lathing & Plastering Handbook.

For the beauty and durability of which plaster is capable, rigid requirements should be followed as to number of coats applied. Three-coat work is mandatory on all metal lath, and on edge-supported gypsum lath used in ceilings; three-coat work is desirable on all gypsum lath; two-coat work is acceptable on gypsum lath when properly supported, and masonry plaster bases. Exceptions are noted below for IMPERIAL Veneer Plasters.

In the preparation of plastering specifications, consideration should be given to the selection of materials not only for compatibility, but for the *quality* of the structure to be plastered. Since ANSI and AIA specifications are based on minimum standards, they should be followed only in applications where minimum plastering quality is desired. It is wise to upgrade plastering specifications wherever possible; all the elements are available for quality installations.

Plastering Performance Selector—Following are general recommendations listed in the order of preference—No. 1 in each case being expected to produce the highest quality results:

Basecoat Plaster (over metal lath)

Scratch Coat

1. STRUCTO-BASE(1)
Plaster, sanded 100:2
2. Wood Fiber, neat, or
sanded up to 100:1
3. Wood Fiber, neat, or
sanded up to 100:1
4. RED TOP Gypsum Plaster,
sanded 100:2
5. Wood Fiber, neat, or
sanded up to 100:1
6. Wood Fiber, neat, or
sanded 100:1

Brown Coat

- STRUCTO-BASE
Plaster, sanded 100:3
- Wood Fiber,
sanded up to 100:1
- RED TOP Gypsum Plaster,
sanded 100:2
- RED TOP Gypsum Plaster,
sanded 100:3
- STRUCTO-LITE Plaster
(sand float finish only)
- RED TOP Gypsum Plaster,
perlited 100:2
(sand float finish only)

(1) Verify availability with your local U.S.G. sales representative.

Basecoat Plaster (over gypsum lath)

See "Use of Aggregates" table, page 3.

Aggregates

- | | |
|-----------------------|--------------------------|
| 1. Sand | 3. Job-mixed Perlite |
| 2. Mill-mixed Perlite | 4. Job-mixed Vermiculite |

Note: Lightweight aggregates should not be used on a construction where sound insulation is a consideration.

Finish Coats

Float Finishes

1. IVORY Lime (92% hydrate), Keenes Cement and white silica sand
2. GRAND PRIZE or RED TOP Lime, RED TOP Gauging and white silica sand

Smooth Trowel Finishes

1. IVORY Lime and STRUCTO-GAUGE Plaster
2. IVORY Lime, RED TOP Gauging, with $\frac{1}{2}$ cu. ft. of perlite fines or fine silica sand
3. IVORY Lime and Keenes Cement
4. GRAND PRIZE or RED TOP Lime, and RED TOP Gauging Plaster

Note: Float Finish 1 and Trowel Finish 2 (except over metal lath) are the only finishes recommended for use over a basecoat containing lightweight aggregate. Finishes 1 and 3 (smooth trowel) provide high abrasion resistance and because of their hardness must be used over a comparably hard basecoat.

types and functions

1. Basecoat Plasters

description

The base of all gypsum plasters is gypsum rock, hydrous calcium sulfate, which has a water content of about 20% in chemical combination. In its manufacture, about $\frac{3}{4}$ of this chemically combined water is removed from the gypsum rock by means of a controlled calcination procedure. Then as water is added at the job, the material crystallizes (sets), reverting to its original chemical composition.

USG Basecoat Plasters can be applied by using either hand or machine methods, on gypsum or metal lath; gypsum or clay tile; concrete or cinder blocks, or other approved plaster bases.

function

Basecoat plasters provide a plastic working material which will conform to most designs and provide the ultimate in durable walls and ceilings.

Fire Protection—Gypsum plaster, properly proportioned with approved aggregates, and used in conjunction with specific plaster bases, provides excellent fire protection (see specific U.S.G. System Folders for fire test data).

Strength—There are significant differences in the strengths of gypsum basecoat plasters (see technical data, page 3). The strength of gypsum basecoat plaster is dependent on five factors:

1. Water-Plaster Ratio—The water required to produce a plastic mix depends on the amount and type of aggregate. Excess water reduces strength.

2. Aggregate Proportion and Size—Correct proportions with gypsum plaster and balanced gradation of particle size (see ASTM C35 for standards) are needed to obtain desired strength.

3. Control of Set—RED TOP Gypsum Plasters are formulated for use with market aggregates, climatic conditions, and job conditions. The quicker a gypsum plaster sets, the stronger the basecoat.

4. Time of Application—Plasters should be applied within one hour after mixing to assure desired strength and proper bond.

5. Ventilation and Drying are important adjuncts to producing a strong basecoat once the gypsum plaster has set. Not only must the plaster be dried, but the moisture must be removed from the building.

Sound Isolation—Gypsum plaster in combination with lathing or various construction systems offers sound transmission loss characteristics suitable for most requirements. Sanded basecoat plasters provide the optimum results (see U.S.G. Construction Selector).

limitations

1. STRUCTO-BASE, or RED TOP Gypsum Plaster, must have aggregate added strictly according to specifications. Use of too much aggregate drastically decreases its strength.

2. Machine application of wood fiber plaster requires the addition of up to 1 cu. ft. of sand per 100 lbs. of plaster.

3. Where sound isolation is the prime consideration in partition or ceiling assemblies, use sand aggregate only, since mass is a controlling factor.

4. Over interior monolithic concrete ceilings, walls, beams, columns or soffits, a high-quality plaster bonding agent, followed by application of basecoat plasters or finish coats, is recommended.

5. Gypsum plasters should not be used where they will come in contact with water or excessive moisture.

Gypsum plasters may be applied to ceilings of open porches, carports, soffits of eaves, walkways, and canopies, but only when these surfaces are horizontal or inclined downward from the structure. All such plaster surfaces should be protected from direct exposure to rain and moisture, and suitable drips and casings provided along edges. Refer to Gypsum Assn. AIA File 21-A-2, Gypsum Plaster in Exterior Locations.

6. Plaster application on masonry or concrete walls, or ceilings that have been coated with bituminous compounds or other waterproofing agents, is not recommended.



Gypsum plaster is readily machine-applied.

Because of the possibility of condensation or water seepage, plastering to interior side of exterior masonry walls above grade or exterior foundation walls below grade is not recommended. In each instance they should be furred and lathed before plastering (see U.S.G. Construction Selector). Subgrade construction should also be waterproofed on the exterior side.

7. The only plaster product recommended for the embedment of electric heat cables is RED TOP Radiant Heat Basecoat Plaster backed by USG R.H. Base or applied directly to monolithic concrete. See page 6 here, and U.S.G. Bulletin P-480.

8. Basecoat plasters must not die or stop against a hollow metal door frame return. Provision must be made to dampen the trim return vibration by grouting, and by the use of special anchors. The grout should be raked out to allow lath and plaster to be inserted into the frame.

RED TOP Wood Fiber Plaster is a gypsum plaster containing fine particles of selected wood fiber. It normally requires the addition of water only; however, when used over masonry plaster bases, 1 cu. ft. of sand per 100 lbs. of plaster must be added, and when used as a scratch or brown coat 1 cu. ft. of sand may be added. Wood fiber plaster can be applied to all standard lath and masonry plaster bases; it is strongly recommended as a scratch coat for metal lath.

Wood fiber weighs approximately $\frac{1}{4}$ less than a sanded gypsum basecoat; has nearly twice the compressive and tensile strength of sanded plaster; is an excellent fire-protective material, generally providing greater fire resistance than sanded gypsum plaster; costs slightly more than sanded gypsum plaster. Complies with ASTM Spec. C28 and Federal Specification No. SS-P-00402B Type III.

RED TOP Gypsum Plaster is a gypsum basecoat requiring the addition of aggregate and water on the job. Supplied in three types: *Regular*—for use with sand aggregate, hand application; *LW*—for use with lightweight aggregate, hand application; *Machine Application*—for use with sand or light-



Smooth curves are easily formed with gypsum plaster and USG Metal Lath.

weight aggregate. Complies with ASTM C28 and Federal Specification No. SS-P-00402B, Type II. **Limitation:** not recommended for use with perlite aggregate when machine applied, with vertical lift over 30 ft. or hose length over 150 ft.

RED TOP Two-Purpose Plaster is a gypsum basecoat requiring the addition of aggregate and water on the job. Suitable for either hand or machine application and use with sand or lightweight aggregate meeting ASTM C35. Two-Purpose Plaster complies with ASTM C28 and Federal Specification No. SS-P-00402B, Type II. **Limitation:** not recommended for use with perlite aggregate when machine applied, with vertical lift over 30 ft. or hose length over 150 ft.

STRUCTO-BASE Gypsum Plaster is a special gypsum basecoat plaster that develops higher strengths than conventional plasters. It is recommended for such areas as handball courts, hospital corridors, schools, etc., or wherever a high strength basecoat plaster is necessary. Complies with Federal Specification SS-P-00402B, Type II, and ASTM Designation C28 for "gypsum neat plaster" including the added requirement of 2,800 psi compressive strength. U.S.G. Technical Letter PM-125 covers application methods for handball courts.

STRUCTO-LITE Gypsum Plaster is a mill-mixed perlite aggregated gypsum plaster which requires the addition of only water at the job site. It is formulated in two types: *Regular*—for use over gypsum or metal lath; *Masonry*—for use on high suction unit masonry base only.

STRUCTO-LITE weighs less than half as much as sanded basecoat plaster; has a "k" factor of 1.74, providing three times the insulation of sanded plaster. For this reason STRUCTO-LITE is not recommended for use with radiant heated panels. The added fire protection afforded by STRUCTO-LITE is the outstanding contribution of the product. Over-all cost is comparable to job-mixed lightweight aggregate plaster. Complies with Federal Specification SS-P-00402B, Type I and ASTM C28 for gypsum ready-mixed plaster.

Limitations: (1) STRUCTO-LITE is not recommended for use over metal lath when a smooth trowel lime finish is to be used. It may be sand float finished, or used as a base for acoustical tile. (2) Not recommended for machine application when vertical lift is over 30 ft. or when pumped through hoses in excess of 150 ft.

Portland Cement-Lime Plaster is used for interior applications where high moisture conditions exist, or as an exterior basecoat for stucco. Prepared on the job as follows:

Scratch and Brown Coats—Mix BONDCRETE or MORTASEAL Mason's Lime with portland cement and sand in accordance with ANSI A42.2, Type L. Suggested proportioning: *scratch coat*—1 bag portland cement, $\frac{3}{4}$ bag lime, 5 to 6 cu. ft. sand; *brown coat*—1 bag portland cement, 1 bag lime, 6 to 7 cu. ft. sand.

Finish Coat—ORIENTAL Exterior Finish Stucco (mill-mixed), a white, or colored float or texture finish plaster.

Limitations of portland cement plaster: (1) Scratch, brown and finish coats require curing with water after set; (2) Must not be applied directly to smooth, dense surfaces, gypsum lath or gypsum block. Self-furring metal lath must be secured to such surfaces before plaster is applied; (3) Control joints should be provided to compensate for shrinkage during drying; (4) A Keenes cement-lime putty finish must never be used over a portland cement basecoat.

Use of Aggregates with Gypsum Plasters

maximum recommended proportions

plaster base	no. of coats	type of coats	maximum quantity of aggregate, in cu. ft. to be used with 100 lbs. of neat gypsum plaster			
			under smooth trowel finishes		under other finishes	
			sand (1)	perlite	sand (1)	perlite
GYPSUM LATH	3	scratch brown	2 3	2 2	2 3	2 3
	2	basecoat	2½	2	2½	2
METAL LATH	3	scratch brown	2 3	— —	2 3	2 2
UNIT MASONRY	3	scratch brown	3 3	3 3	3 3	3 3
	2	basecoat	3	3	3	3

(1) Approximately six No. 2 shovels of sand equal 1 cu. ft. One shovel equals 15 lbs. Note: In a construction system which has metal lath as the plaster base, perlite or vermiculite aggregate is not recommended for use in the basecoat plaster, unless a float or acoustical tile finish is used.

Technical Data—Basecoat Plasters

plaster	mix	compressive strength psi-dry (1)	weight lb. cu. ft. —dry	conductivity (k)
STRUCTO-LITE (regular)		600-800	50	1.74
wood fiber	neat	1500-2000	82	3.15
wood fiber (sand)	100:1	1200-1600	97	—
STRUCTO-BASE (sand)	100:2 100:2½ 100:3	2800-3200 1900 min. 1400 min.	124 120 118	—
RED TOP gypsum plaster mixed with—	sand	100:2 100:2½ 100:3	750-1100 650-850 550-750	107 108 109
		100:2 100:3	600-800 450-600	48 41
		100:2 100:3	400-525 250-325	48 41
	vermiculite			5.51 — 5.60 1.64 1.31 1.74 1.42

(1) Average Laboratory Test Results. Figures may vary slightly for products from individual mills. Tested in accordance with ASTM C472. Aggregate is in cu. ft.

Thermal Coefficient of Expansion (unrestrained)

[Inches/inch/°F. (40°–100°F.)]

Sanded Gypsum Plaster (100:2, 100:3).....	7.0x10 ⁻⁶
Wood Fiber Plaster (sanded 100:1).....	8.0x10 ⁻⁶
Gypsum Lath.....	9.0x10 ⁻⁶

Hygrometric Coefficient of Expansion (unrestrained)

[Inches/inch/% R.H. (5%–90% R.H.)]

Gypsum Lath.....	5.4x10 ⁻⁶
Sanded Gypsum Plaster (100:2, 100:3).....	1.5x10 ⁻⁶
STRUCTO-LITE Plaster (regular).....	4.8x10 ⁻⁶
Vermiculite Gypsum Plaster (100:2).....	3.8x10 ⁻⁶
Wood Fiber Plaster (sanded 100:1).....	2.8x10 ⁻⁶



machine spray applied



dashed and troweled

2. Finish Coat Plasters

description

There are several types of gypsum finish plasters; some used with the addition of water only, and others which are a blend of gypsum, lime and water, or gypsum, lime, sand and water.

Since the finish coat must be compatible with the basecoat, care must be taken in the selection of the finish coat materials in relationship with the characteristics of the basecoat.

Three general classifications of finishing materials are (1) prepared finishes; (2) smooth trowel finishes; (3) sand float finishes.

function

The finish coat serves as a leveling coat, as a base for decoration and provides the required resistance to abrasion.

Gauging plasters impart an early hardness and strength, minimizing the shrinkage characteristic of lime.

limitations

1. A smooth trowel finish should not be used over lightweight aggregate gypsum basecoat applied over metal lath. A sand float finish is recommended.

2. Where the gypsum basecoat is STRUCTO-LITE or contains lightweight aggregate (perlite or vermiculite) and a smooth trowel finish is used, the finish coat should be RED TOP Gauging Plaster and lime, with addition of $\frac{1}{2}$ cu. ft. of perlite fines or 50 lbs. of No. 1 white silica sand per 100 lbs. gauging plaster, or a factory-aggregated gauging plaster.

3. Gypsum or lime base finishes, including Keenes cement, should not be used directly over a portland cement basecoat or over concrete block or other masonry surfaces.

4. In smooth trowel finishes, gauging plasters providing an extremely hard surface, such as STRUCTO-GAUGE and Keenes cement, must not be used over STRUCTO-LITE Plaster or a basecoat with a lightweight aggregate.

See the chart, page 5, for selection of finish coat materials.

ORIENTAL Exterior Finish Stucco is a mill-prepared, water-resistant finish for use over portland cement-lime basecoats only. Requires addition of water only. Float, texture, stipple, sponge, spatter-dash or rough coat finishes may be used (examples right); not designed for smooth trowel finish. Available in white and 7 colors for hand or spray application.

gauging plasters (for blending with lime putty)

STRUCTO-GAUGE Gauging Plaster is a high-strength gypsum gauging plaster that provides extreme hardness, resistance to surface abrasion; Quick or Slow Set. Use only over a high-strength basecoat—wood fiber, sanded gypsum, STRUCTO-BASE or IMPERIAL Basecoat Plaster. Complies with ASTM C28 and Federal Specification SS-P-00402B, Type V, with the added requirement of 5,000 psi compressive strength (neat).

RED TOP Keenes Cement—A dead-burned gypsum gauging, which requires extensive troweling except in regular sand float finishes. This troweling densifies the surface for hardness and resistance to surface abrasion. Complies with ASTM C61 and Federal Specification SS-C-161A Type I (Regular), II (Quick Troweling).

CHAMPION and STAR White Gauging Plaster—These are conventional quick and slow set gauging plasters available with perlite fines for use over lightweight aggregated basecoats, or unaggregated for use over sanded basecoats. Comply with ASTM C28 and Federal Spec. SS-P-00402B, Type V.

RED TOP Gauging Plaster—Similar to CHAMPION and STAR Gauging except it comes in a slightly darker color. Available either perlited or unaggregated. Complies with ASTM C28 and Federal Specification SS-P-00402B, Type V.

Monotron Surface Hardness (1)

(Lbs. required to force a 10 mm. diameter steel ball .01" into plaster face)

gauging-lime ratio (dry weight)	STRUCTO-GAUGE	regular gauging	Keenes Cement regular	quick-troweling
1:2	106	75		
1:1	236			
2:1			75	
4:1			88	112
				139

(1) Avg. laboratory-tested values when applied over sanded basecoat.

application data—USG Interior Finish Coat Plasters

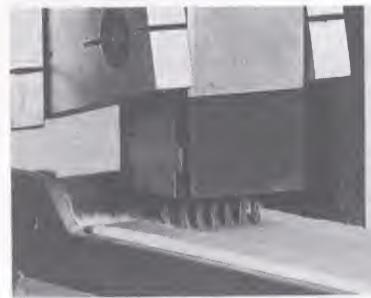
description	finish texture	physical properties	proportion by dry weight gauging to lime	workability factor	comments	cost index
STRUCTO-GAUGE and Lime Putty	Smooth Trowel	Extremely hard and resistant to abrasion	1:1	2	Use for handball courts, corridors over a wood fiber, STRUCTO-BASE or IMPERIAL Basecoat Plaster.	150
		Hard and resistant to abrasion	1:2	1	Use over a wood fiber, sanded gypsum or IMPERIAL Basecoat Plaster.	125
Keenes Cement and Lime Putty	Smooth Trowel	Hard and resistant to abrasion	4:1	7	Use for handball courts and psychopathic wards over a wood fiber basecoat.	180
		Medium hard and resistant to abrasion	2:1	4	Use for hospitals and schools over a wood fiber or sanded gypsum basecoat.	170
Gauging Plaster and Lime Putty	Smooth Trowel	Standard	1:2	1	For normal use; over lightweight aggregate basecoat add $\frac{1}{2}$ cu. ft. of perlite fines or 50 lbs. of #1 silica sand per 100# gauging.	100
Keenes Cement, Lime Putty and Sand	Float Finish	Hard	100 lbs. Keenes 50 lbs. Lime 400 lbs. Sand	1	Commonly used float finish, may be satisfactorily colored.	125
Gauging Plaster, Lime Putty and Sand	Float Finish	Standard	50 lbs. Gauging 100 lbs. Lime 400 lbs. Sand	1	For normal use over any basecoat.	100
IMPERIAL Finish Plaster	Smooth Trowel or Float Finish	Hard and resistant to abrasion	Neat	1	For use over IMPERIAL Plaster Base or over IMPERIAL Basecoat Plaster.	150
RED TOP Radiant Heat Finish Plaster	Smooth Trowel, Texture or Float Finish	Extremely dense; resists heat deterioration	Neat	1	Use over RED TOP Radiant Heat Basecoat Plaster in wood frame, metal grillage, concrete ceilings.	150

finishing limes

IVORY Finish Lime—Autoclaved—A 92% hydrated finishing lime. Does not require soaking, and virtually eliminates the possibility of future expansion within the finish coat because of unhydrated magnesium oxides. Complies with ASTM C206, Type S, and Federal Specification SS-L-351b, Type F (not more than 8% unhydrated oxides).

RED TOP and GRAND PRIZE Normal Hydrate Finish Lime—Hydrate lime which requires soaking at least 16 hours to develop proper plasticity and the degree of hydration necessary prior to use. Complies with ASTM C6, Type N, and Federal Specification SS-L-351b, Type F.

RED TOP Finish Quicklime—High-calcium finishing lime which requires 16 hours of soaking to develop a proper plasticity and the required degree of hydration prior to use. Complies with ASTM C5.



(Left) Test demonstrates IMPERIAL Plaster's superior abrasion resistance. When scoured 250 times by a 25-lb. weighted brush, penetration into the finish was never more than one millimeter. (Below) Finish plaster ready for application.



3. Veneer Plasters

IMPERIAL Plaster is a veneer interior product that trims days from plaster finishing schedules and provides exceptionally high strength and abrasion resistance (3,000 psi). Its applied cost averages only slightly above conventional drywall cost. Applied to thickness of $\frac{1}{16}$ " to $\frac{3}{32}$ "; requires only the addition of clean water. Qualifies for ratings of up to two hours and 53 STC in metal frame constructions (see U.S.G. Folder SA-912) and in wood frame assemblies (see U.S.G. Folder SA-913). Complies with ASTM C587. Available in two types:

IMPERIAL Finish Plaster—for single-coat application composed of scratch coat and immediate doubling back directly over special gypsum IMPERIAL Plaster Base, glass-fiber tape



RED TOP Radiant Heat Plaster application

and special corner bead or over IMPERIAL Basecoat Plaster in two-coat system. Provides a smooth trowel, float, or spray texture finish ready for decoration.

IMPERIAL Basecoat Plaster—for use where two-coat application and a high-strength conventional finish are preferred. Can be applied to either IMPERIAL Plaster Base, directly to concrete block or over a bonding agent on monolithic concrete. Formulated to receive IMPERIAL Finish Plaster, high-strength gauged lime putty, STRUCTO-GAUGE-lime, or Keenes-lime-sand float finishes.

Both types are available in machine and hand-applied formulations. The machine-application basecoat and finish are spray-applied in a patented process. See U.S.G. Folder SA-917 for other components used in these IMPERIAL Plaster systems.

RED TOP Radiant Heat Basecoat and Finish Plasters are high-density formulations for use with electric cable ceilings. Allow higher operating temperatures than with other products, provide more heat transmission and greater resistance to heat deterioration. Basecoat is hand or machine-applied to cover cable. Finish Coat is applied $\frac{1}{16}$ " to $\frac{3}{32}$ " to bring total plaster thickness to $\frac{1}{4}$ " over special USG R.H. Base attached to wood joists (see U.S.G. Bulletin P-480), to metal furring channel or suspended metal grillage, or to $\frac{3}{8}$ " thickness over a bonding agent directly to monolithic concrete ceilings. Mill-prepared, requires addition of water only. Meets NEC requirements. U.L. listed.

4. Special Plasters

RED TOP Moulding Plaster is used in specialized work such as cast ornamental enrichments or running cornices. The grind is conducive to fine detail; controlled set helps obtain exact reproduction. Available in white and grey colors. Complies with ASTM C28 and Federal Specification SS-P-00402B, Type V.

RED TOP Casting Plaster, for general casting shop use, produces excellent detail in fine plaques and art statuary. The material has outstanding characteristics of plasticity, surface hardness, strength. Only water is added.

general plastering specifications

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials, except water and sand, shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, the temperature of the building shall be maintained in the uniform range above 55°F. for an adequate period prior to the application of plaster, while the plastering is being done, and after the plaster is dry. The heat shall be well distributed in all areas, with deflection or protective screens used to prevent concentrated or irregular heat on plaster areas near source. When required, heat shall be furnished by ().

b. Ventilation shall be provided to properly dry conventional plaster during and subsequent to its application. In glazed buildings, this shall be accomplished by keeping windows open sufficiently to provide air circulation; in enclosed areas lacking normal ventilation, provisions must be made to mechanically remove moisture-laden air. For veneer plaster, a minimum ventilation level shall be maintained until the plaster has set and dried.

c. If glazed sash are not in place and the building is subjected to hot, dry winds or temperature differentials from day to night of 20°F or more, openings shall be screened with cheesecloth or similar material.

1.5 protection

Proper protection shall be provided during plastering for finished door and window frames and other designated areas which do not receive a plaster finish.

Part 2: products

2.1 materials

a. **Basecoat Plaster:** (STRUCTO-BASE Gypsum Plaster) (RED TOP Wood Fiber Plaster) (RED TOP Gypsum Plaster) (RED TOP Two-Purpose Plaster) (STRUCTO-LITE Plaster) (IMPERIAL Basecoat Plaster) (RED TOP Radiant Heat Basecoat Plaster).

b. **Aggregate:** (Sand) (Perlite) meeting ASTM C35 requirement. Sand for float finishes shall be graded (white) silica sand passing a (30 mesh) (20 mesh) screen.

c. **Water:** Potable and not contain impurities that affect the setting of gypsum.

d. **Finish Lime:** (IVORY) (GRAND PRIZE) (RED TOP).

e. **Gauging Plaster:** (STRUCTO-GAUGE) (Keenes Cement) (STAR) (CHAMPION) (RED TOP).

f. **Prepared Finish:** (IMPERIAL Finish Plaster) (RED TOP Radiant Heat Finish Plaster).

g. Plaster Ornaments and Mouldings: RED TOP (Moulding) (Casting) Plaster.

h. Exterior Stucco Finish: ORIENTAL Exterior Finish.

i. Grout: (RED TOP Gypsum Plaster) (STRUCTO-LITE Basecoat).

2.2 mixes

a. **Basecoat Plaster (and Aggregate)** shall be mixed in proportions of _____ (specify from technical data, page 3).

b. **Finish Plaster** shall be mixed in proportion by dry weight of _____ parts of gauging to _____ parts of lime (specify from application data, page 5), according to the manufacturer's directions. Over lightweight aggregate basecoats, add $\frac{1}{2}$ cu. ft. of perlite fines or 50 lbs. of No. 1 silica sand per 100 lbs. of gauging plaster, or use mill-aggregated gauging.

c. **IVORY Lime** shall be box soaked or machine mixed for immediate use with approx. $5\frac{1}{2}$ to 6 gallons of water for each 50-lb. bag.

d. **GRAND PRIZE or RED TOP Lime** shall be box soaked or machine mixed using approx. 6 gallons of water per 50-lb. bag, and allowed to soak for 16 hours.

Part 3: execution

3.1 surface preparation

a. Monolithic concrete to which a plaster bonding agent is to be applied shall be free of dirt, dust, grease, wax, oil or other unsound surface conditions. Laitance, efflorescence and parting compounds shall be chemically removed.

b. Monolithic or unit masonry surfaces that exhibit high suction shall be moderately wetted immediately before plastering.

3.2 grounds—Plaster thicknesses shall be as shown on plans; however, in no case shall the grounds be less than:

USG Metal Lath— $\frac{5}{8}$ " (from face of lath)

ROCKLATH Plaster Base— $\frac{1}{2}$ "

Long Length ROCKLATH— $\frac{3}{4}$ "

PYROBAR Partition Tile or other Masonry Units— $\frac{5}{8}$ "

Monolithic Concrete Ceilings— $\frac{1}{8}$ " ($\frac{3}{8}$ " maximum)

Monolithic Concrete Walls— $\frac{1}{8}$ " ($\frac{3}{8}$ " maximum)

IMPERIAL Plasters— $\frac{1}{16}$ " to $\frac{3}{32}$ " (over special gypsum base)

RED TOP Radiant Heat Plasters— $\frac{1}{4}$ " (over special gypsum base); $\frac{3}{8}$ " (over monolithic concrete)

3.3 basecoat application—Mix basecoat plasters by hand or in a mechanical mixer to a uniform consistency following manufacturer's directions. Apply basecoat plaster by (hand) (machine) in (1) (2) coats.

a. **Two-coat work:** Over gypsum lath and masonry, apply base (first) coat with sufficient material and pressure to form good bond to base and to cover well, and then double back to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water and leave rough to receive finish (second) coat.

b. **Three-coat work:** Apply scratch (first) coat with sufficient material and pressure to form good full keys on metal lath, and good bond on other bases, and then cross-rake. Apply brown (second) coat after scratch (first) coat has set firm and hard. Bring out to grounds and straighten to a true surface with rod and darby without use of additional water. Leave rough to receive finish (third) coat.

3.4 special applications

a. **Solid Long Length Gypsum Lath Partition:** Apply scratch coat $\frac{3}{8}$ " thick, with a maximum set of 3 hours, to each side of lath, both sides to be scratch coated within 3-hours. Cross-rake lightly in horizontal direction only. Apply brown coat to unbraced side after scratch coats have set and partially dried (not less than 16 hours). After brown coat has set firmly (not less than 3 hours), carefully

remove braces and brown coat second side. Bring brown coat out to a true plane and leave rough.

b. **Solid Studless Metal Lath Partition:** Apply scratch coat to side opposite bracing, and allow to set and partially dry. Then apply brown coat to side opposite braces, allowing it to set thoroughly before removing temporary braces. Next apply brown coat to previously braced side to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water, and leave rough to receive finish coat.

c. **Solid Channel Stud Metal Lath Partition:** Apply scratch coat to lath side and allow to set and partially dry. Then apply back-up coat to channel side to full grounds, $\frac{1}{2}$ " over channels, in not less than two operations and allow to set. Then apply brown coat on lath side to bring plaster out to grounds. Straighten to a true surface with rod or darby without use of additional water, and leave rough to receive finish coat.

d. **Resilient ROCKLATH Plaster Base Ceiling:** Use three-coat method only, allowing scratch coat to set and partially dry before applying brown coat.

e. **BRACE-TITE System Ceiling:** The three-coat method is recommended. If the two-coat system is used, a minimum of 20 minutes must be allowed before doubling back and the setting time of the basecoat must not exceed 3 hours.

f. **Monolithic Concrete:** Apply plaster bonding agent to concrete surface in a continuous film, at 55°F. or above. Apply basecoat plasters when film is slightly tacky or within two weeks. Apply basecoat plaster by firmly grinding a thin coat into the bonding agent. Immediately double back to a completed thickness of $\frac{1}{16}$ " to $\frac{3}{32}$ " having a level surface ready for finish plaster application.

g. **Portland Cement Basecoats** shall be proportioned (specify from page 3), and applied in two coats. Cross-rake scratch coat and after setting, damp-cure for not less than 48 hours. Damp-cure brown coat after setting for not less than 48 hours.

h. **IMPERIAL Basecoat Plaster:** When applied directly over concrete block, fill all voids and depressions including joints; leave rough and allow to set prior to lime putty finish application. Spray concrete block uniformly with water immediately before applying IMPERIAL Basecoat Plaster. Cover monolithic concrete surfaces with an application of plaster bonding agent prior to plastering. RED TOP Accelerator may be used to quicken set. Total basecoat shall be $\frac{1}{16}$ " to $\frac{3}{32}$ " thick.

i. **IMPERIAL Basecoat Plaster:** When applied directly to IMPERIAL Plaster Base, embed tape and fill beads, and allow plaster to set; then scratch and immediately double back to a thickness of $\frac{1}{16}$ " to $\frac{3}{32}$ ", in accordance with manufacturer's directions.

j. Where plaster is flush with metal base, metal door frames, etc., groove at the junction to reduce the possibility of chipping. Cut basecoat plaster free from these metal sections before plaster sets.

k. **Basecoats in ORIENTAL Exterior Finish Stucco Applications** shall be mixed with BONDCRETE or MORTASEAL Mason's Lime and applied per manufacturer's directions.

l. **Handball Courts:** Basecoat shall be STRUCTO-BASE Gypsum Plaster, mixed with sand in proportions by weight of 1:3 when applied to PYROBAR Gypsum Tile, clay tile or concrete block; of 1:2½ when applied to metal lath over monolithic concrete. Apply plaster to minimum grounds of $1\frac{1}{4}$ " on walls subjected to heavy impact, of $\frac{7}{8}$ " on other walls, and bond firmly without voids. Rough-screed basecoat to a true plane and float with a devil's float.

Finish coat shall be IVORY Lime mixed in proportion by weight of 1:1 with STRUCTO-GAUGE Gypsum Plaster. Scratch putty in thor-

oughly and double back to fill out to $\frac{1}{2}$ " thickness. Finish trowel to a smooth, dense surface. (See U.S.G. Folder SA-917 for lathing specifications.)

m. Grout all steel door frames in solid plaster and steel stud partitions prior to lathing.

3.5 finish coat application

a. **Trowel Finish Coats:** Scratch plaster in thoroughly and immediately double back to fill out to a smooth, dense surface for decoration, free of surface blemishes and irregularities. Apply finish coat as thin as possible, preferably $\frac{1}{16}$ " to not more than $\frac{1}{8}$ " maximum thickness. Trowel Keenes Cement Finishes until the material sets.

b. **Float Finish Coats:** Scratch plaster in thoroughly and immediately double back to a true, even surface. Float using a (shingle) (cork) (wood) (carpet) or (rubber) float to bring aggregate to the surface to produce a finish of uniform texture free of slick spots, cat faces and other blemishes. Use water sparingly in natural color, and no water on colored finishes. With ORIENTAL Exterior Finish Stucco, use no water in floating or texturing. Fog-spray surface with water for several days after setting.

c. **Machine-Applied Spray Finishes:** Apply plaster uniformly to produce a texture approved by the architect.

d. **IMPERIAL Finish Plaster:** Over IMPERIAL Plaster Base embed tape, fill beads and allow to set; then scratch and immediately double back to a thickness of from $\frac{1}{16}$ " to $\frac{3}{16}$ ", in accordance with manufacturer's directions. Over IMPERIAL Basecoat Plaster, scratch and immediately double back to $\frac{1}{16}$ " thickness.

e. **RED TOP Radiant Heat Plasters:** In wood frame and metal grillage constructions, apply plasters according to manufacturer's specifications (see U.S.G. Bulletin P-480). In monolithic concrete

ceilings, prepare the surface with plaster bonding agent in a continuous film. Apply RED TOP Radiant Heat Plaster in same manner prescribed for wood frame ceilings except to total thickness of $\frac{3}{8}$ "—consisting of $\frac{1}{16}$ " fill coat of Basecoat Plaster to completely cover the cable and anchor device, and $\frac{1}{16}$ " coat of Finish Plaster.

3.6 ornamental plastering

Execute ornamental plaster in accordance with scale details shown on the drawings. Run cornices and mouldings full, straight and true with moulding plaster, using clean cut metal conforming to the profiles shown on the drawings. Align lines accurately with square intersections, and accurate miters at corners and angles. Prepare enriched ornamental work which cannot be run in place with RED TOP Casting Plaster cast in gelatine molds. Back the work solidly with jute or burlap and properly reinforce with galvanized steel. Anchor securely with copper wires not lighter than 16 gauge. Make all joints carefully and point neatly so as to be invisible. Sandpaper rough spots and leave the entire work in proper condition, ready for decoration.

3.7 patching

Point up around trim and other work. Cut out and patch defective and damaged plaster. Patch plaster to match existing work in texture and finish flush and smooth.

3.8 completion

At the completion of the finish plaster work, clean all plaster from beads, screeds, metal base and metal trim, leaving work ready for decoration by others. Remove all plaster rubbish, excess material, scaffolding, tools and other equipment from the building, leaving floors broom clean.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, RED TOP, STRUCTO-LITE, STRUCTO-BASE, STRUCTO-GAUGE, BONDCRETE, ORIENTAL, FIRECODE, IMPERIAL, IVORY, GRAND PRIZE, CHAMPION, STAR, PYROBAR, ROCKLATH, MORTASEAL, BRACE-TITE, TEXOLITE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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fire-resistant drywall partitions for enclosing shafts in multi-story buildings

USG Shaft Walls incorporate all important shaft wall characteristics at minimum cost. Compared to masonry shaft walls, they offer faster installation and lower material cost, producing lower in-place costs. Their lighter weight allows savings in structural steel. In addition, USG Shaft Walls provide up to 4-hour fire resistance, effective sound control and the structural strength to resist lateral loads up to 15 psf.

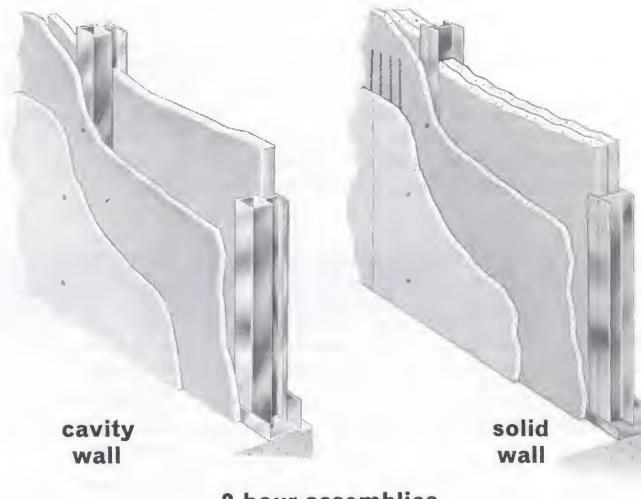
description

USG Shaft Walls are lightweight non-load bearing gypsum drywall assemblies. They are designed for erection from outside the shaft at each floor. Shafts can be enclosed during early construction stages, the walls finished later along with interior partitions. This fast-installation feature, combined with low cost, light weight and high performance values, make USG Shaft Walls superior for enclosing elevator and mechanical shafts, air ducts and stairwells in multi-story buildings.

Available in two basic systems—**USG Cavity Shaft Walls** (below), and **USG Solid Shaft Walls** (page 2). For application of these systems as Area Separation Walls, see U.S.G. Folder SA-924.

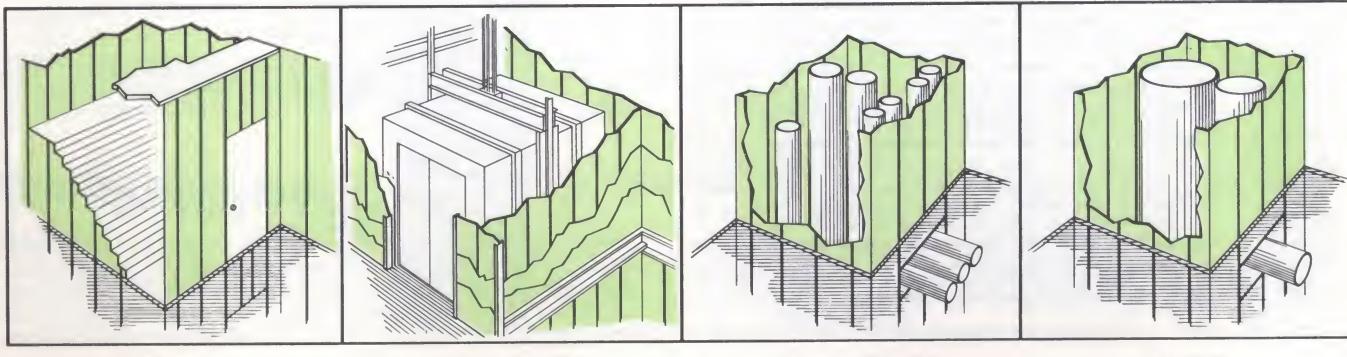
USG Cavity Shaft Walls offer maximum versatility and minimum weight. They provide excellent sound and fire resistance plus a vertical chaseway $1\frac{1}{2}$ " deep x $22\frac{1}{2}$ " wide for installation of electrical services and sound attenuation blankets. In addition, Cavity Shaft Walls can accommodate virtually all floor-to-ceiling height requirements. The assemblies consist of SHEETROCK FIRECODE "C" Gypsum Panels or IMPERIAL FIRECODE "C" Plaster Base and Veneer Plaster, steel studs and runners, and USG Shaft Wall Liner.

Liner panels are installed vertically between USG Steel J-Runners attached to floor and ceiling. Panel edges are inserted into specially formed USG Steel T-Studs or E-Studs spaced 24" or 16" o.c., depending upon design requirements. The shaft wall is completed with double-layer SHEETROCK Panels and a DURABOND Joint System, or with IMPERIAL Plaster Base and Veneer Plaster applied to one side of the studs. Where both sides of the wall must be finished and decorated, a single layer of panels is applied to each side of studs. Additional layers of panels are installed to provide 3 and 4-hour fire-rated construction (see details page 4).



The liner has a special gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Panels have beveled edges, are 1" thick, 16" and 24" wide and are available in lengths to 16 ft.

SHEETROCK FIRECODE "C" Panels for these systems are $\frac{5}{8}$ " thick and 4 ft. wide, have eased radial tapered edges specially designed to overcome joint deformation. IMPERIAL FIRECODE "C" Plaster Base, $\frac{5}{8}$ " thick and 4 ft. wide, has a high-strength, high-density core covered with special absorption face paper for veneer plastering. USG Steel J-Runners, J-Struts, T-Studs and E-Studs are formed from hot-dipped galvanized steel.



lightweight, sturdy partitions— fast, low-cost construction

USG Solid Shaft Walls offer a choice of assemblies to meet a variety of design requirements. They provide 1, 2 or 3-hour fire resistance and good sound resistance; consist of **SHEETROCK SW Panels** or **IMPERIAL Plaster Base and Veneer Plaster**, steel studs and runners, and **USG Laminated Gypsum Coreboard**.

Laminated Coreboard Panels are installed vertically between USG Steel J-Runners attached to floor and ceiling. Panel edges are inserted into USG H-Studs or C-Channels spaced 24", 16" or 12" o.c., depending upon design requirements. The assemblies are completed with single or double-layer **SHEETROCK SW Panels** and a **DURABOND Joint System**, or with **IMPERIAL Plaster Base and Plaster** applied to one side of coreboard.

USG Coreboard is composed of two fireproof gypsum core panels faced with strong gray liner paper, factory-laminated using mineral adhesive. The laminated panels have beveled edges, are available in 2" thickness in 12", 16" and 24" widths, in lengths to 16 ft. **SHEETROCK SW Panels** and **IMPERIAL Plaster Base** for these assemblies are $\frac{1}{2}$ " or $\frac{5}{8}$ " thick with other dimensions the same as for Cavity Shaft Walls. USG Steel J-Runners, H-Studs and C-Channels are formed from hot-dipped galvanized steel. Test data shown below.



USG Shaft Walls withstand air-pressure loads which high-speed elevators create. These forces have dislodged masonry units in some building shafts.

fire rating	description	test no.	stc rating		comments
			11-f	16-f	
1 hr.	Solid Shaft Wall Gypsum Drywall— $\frac{5}{8}$ " SHEETROCK gypsum panels—2" USG lamin corebd set betw USG stl H-studs 24" o.c.—single layer panels one side appl vert & screw att—joints fin wt 11 width 2 $\frac{5}{8}$ "	T-4422-OSU	(f)		Fire rating also applies with IMPERIAL Plaster Base and veneer plaster surface
				N/A	
2 hrs.	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl T-studs 24" o.c.—panels appl to side opp liner panels & screw att—base layer appl horiz—face layer appl vert—joints fin wt 10 width 3 $\frac{3}{4}$ "	U of C 8-18-70 U of C 7-19-71	(f) (f)		Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
		TL-71-21 TL-70-270	(s) (s)	44 39	TL-71-21 based on same constr. with 1" blankets in cavity
2 hrs.	Cavity Shaft Wall Gypsum Drywall— $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels—1" USG shaft wall liner panels set betw USG stl T-studs 24" o.c.—single layer panels each side appl vert & screw att—joints stag on opp sides & fin wt 10 width 3 $\frac{3}{4}$ "	U of C 7-14-71 U of C 7-16-74	(f) (f)		Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
				N/A	
2 hrs.	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl T-studs 24" o.c.—RC-1 chan spaced 24" o.c.—1 $\frac{1}{2}$ " THERMAFIBER sound attenu blkts—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin wt 11 width 4 $\frac{1}{4}$ "	U of C 2-8-72	(f)		Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
		BBN-711113	(s)	51	
2 hrs.	Solid Shaft Wall Gypsum Drywall—2 layers $\frac{1}{2}$ " SHEETROCK gypsum panels one side—2" lamin corebd set betw USG stl H-studs 24" o.c.—panels appl vert with joints stag—base layer screw att—face layer lamin & screw att—joints fin wt. 13 width 3"	T-4481-OSU	(f)		Fire rating also applies with IMPERIAL Plaster surface
		TL-68-78	(s)	38	Sound test based on $\frac{5}{8}$ " thick gypsum panels
3 hrs.	Cavity Shaft Wall Gypsum Drywall—3 layers $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl T-studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer appl horiz—joints fin wt 12 width 4 $\frac{1}{4}$ "	U of C 2-16-72	(f)		Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
3 hrs.	Solid Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK gypsum panels one side—2" USG lamin corebd set betw USG stl H-studs 24" o.c.—panels appl vert with joints stag—horiz USG met fur chan 24" o.c. betw panel layers—both layers screw att—joints fin wt 14 width 4 $\frac{1}{4}$ "	T-4423-OSU	(f)		Fire rating also applies with IMPERIAL Plaster Base and veneer plaster surface
				N/A	
4 hrs.	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels face side—1" USG shaft wall liner panels set betw USG stl T-studs 24" o.c.—1" liner panels & $\frac{5}{8}$ " gypsum panel core screw att to studs—horiz USG met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin wt 16 width 6 $\frac{1}{4}$ "	U of C 5-24-74	(f)		Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface

engineered performance to meet design requirements

The systems have been designed and tested using accepted engineering practices with deflection criteria of 1/120, 1/240 and 1/360 clear partition heights. A wide range of product and installation combinations is available to meet performance requirements: air pressure loading of 5, 7½, 10, 15 psf; vertical heights up to 16 ft. with Solid Shaft Walls and 12", 16" and 24" stud spacing; heights up to 12 ft. with Cavity Shaft Walls using 2½" studs, up to 28 ft. for lobbies and mechanical rooms using special 4" and 6" E-Studs (see Design Tables, page 9).

fire resistance

Up to 3-hour fire-resistance ratings with USG Solid Shaft Walls and 4-hour ratings with Cavity Shaft Walls.

faster completion—earlier occupancy

USG Shaft Walls erect easily using components and application procedures familiar to mechanics. Cavity Shaft Walls, because they are erected without adhesives, install faster than other multi-layer gypsum panel systems. All USG Shaft Wall Systems install from each floor, leaving shaft free of scaffolding. Elevators go in months earlier than with masonry enclosures—ready to move men and materials to floors when they are needed. Jobs move faster, schedules are more easily met and buildings can be occupied sooner.

versatility

Wide range of product and installation combinations to meet desired performance requirements; floor-to-ceiling heights up to 28 ft., air pressure loadings of 5, 7½, 10 and 15 psf.

economy

USG Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 10 psf for Cavity Shaft Walls to 14 psf for Solid Shaft Walls. In high-rise buildings, where masonry shaft enclosures can weigh up to 45 psf, USG Shaft Walls offer an opportunity for significant savings in structural steel framing costs.

sound control

The standard Cavity Shaft Wall assembly offers 39 STC rating; 44 STC can be obtained by adding 1" THERMAFIBER Sound Attenuation Blankets within the partition cavity and 51 STC with RC-1 SHEETROCK Resilient Channels and 1½" THERMAFIBER Blankets. Solid Shaft Walls offer 38 STC rating.

provide airtight seal

With USG Acoustical Sealant applied to partition perimeter and penetrations, the assemblies resist air leakage up to 50 psf (see details). This minimizes whistling and dirt accumulation due to air movement and makes these systems ideal for elevator and return air shafts.

limitations

1. Non-load bearing.
2. Stud and runner thickness, stud spacing, air pressure loading and maximum flexural stress shown in the Design Data Tables should not be exceeded.
3. Elevator door frames should be independently mounted.
4. Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
5. With Cavity Shaft Walls, steel studs should not be penetrated to accommodate horizontal runs of electrical conduit. Furred construction is required to accommodate horizontal electrical or mechanical services.
6. With Solid Shaft Walls, two-coat work is required with veneer plaster when heights exceed 12 ft. or when 3-hour fire-rated assembly is used.

specifications

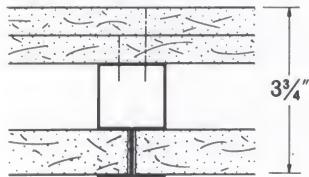
notes to architect

1. *Shaft wall surfaces should be isolated with control joints or other means where: (a) construction changes within the plane of the shaft wall; (b) shaft wall run exceeds 50'. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.*
2. *Penetrations of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.*
3. *Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.*
4. *Where shaft walls enclose elevator and return air vents, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement.*
5. *USG Brand Type S Screws are suitable for gypsum panel or plaster base attachment to 25-ga. steel studs. Type S-12 Screws should be specified for all other applications to 20-ga. steel. Screw length should be 1" for base layer and 1½" for face layer and at least ¾" longer than the total thickness for other applications.*
6. *DURABOND Joint Compound and PERF-A-TAPE Reinforcing are recommended for joint treatment of IMPERIAL Plaster Base.*
7. *In steel frame construction, runners and studs attached to beams and columns should be installed before steel is spray-fireproofed. Excess fireproofing should be removed from runners and studs before installing shaft wall liner or laminated core-board and sealant.*
8. *Deflection—Selection of limiting heights should be based on allowable deflection as follows: (a) 1/240 for gypsum panel surfaces, IMPERIAL Plaster surfaces, and areas to receive adhesively applied ceramic tile; (b) mechanically attached marble or heavy stone should support its own weight from the floor or be separately supported. While some building codes permit design using 1/120 deflection and 5 psf uniform load, this large deflection may cause failure of screws attaching gypsum panels to steel components.*
9. *Metal door frames should be at least 16-ga. steel, shop-primed, and have throats accurately formed to overall thickness of the shaft wall plus ¾" minimum. They should be*

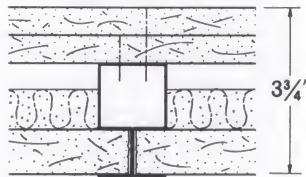
(continued on page 10)

components

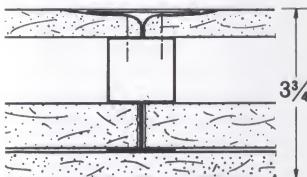
rated assemblies cavity walls



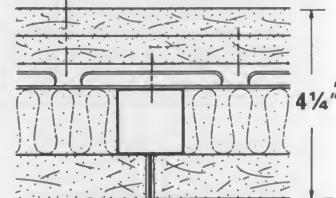
2 Hr.—U of C 8-18-70
2 Hr.—U of C 7-19-71
39 STC—TL-70-270



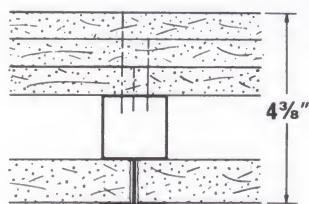
2 Hr. est.
44 STC—TL-71-21



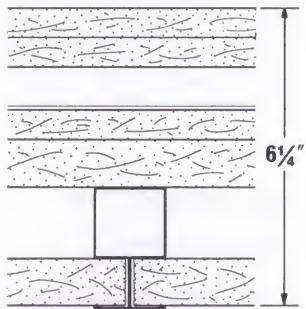
2 Hr.—U of C 7-14-71
2 Hr.—U of C 7-16-74
39 STC est.



2 Hrs.—U of C 2-8-72
51 STC—BBN-711113

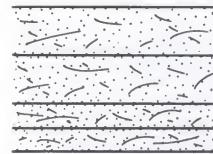


3 Hrs.—U of C 2-16-72



4 Hrs.—U of C 5-24-74

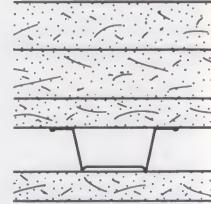
solid walls



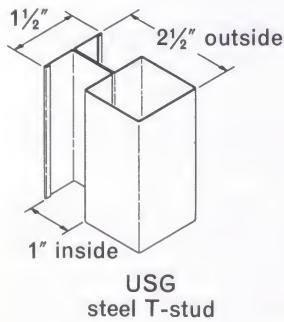
3" 2 Hrs.
T-4481 OSU



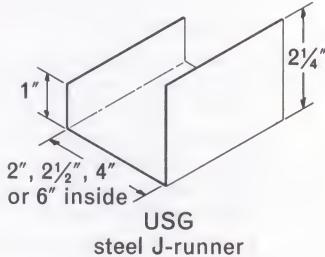
2 5/8" 1 Hr.
T-4422 OSU



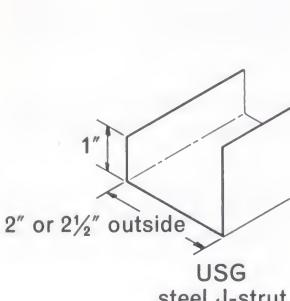
4 1/8" 3 Hrs.
T-4423 OSU



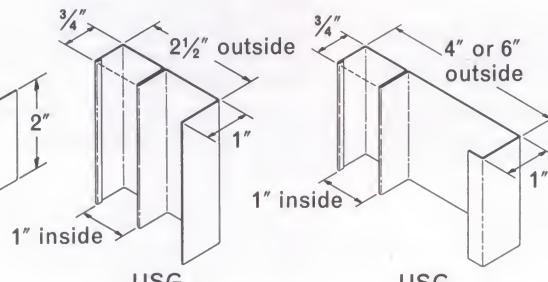
USG
steel T-stud



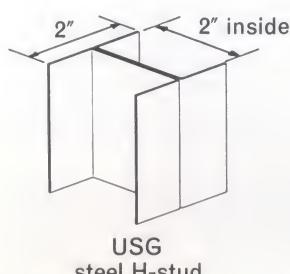
USG
steel J-runner



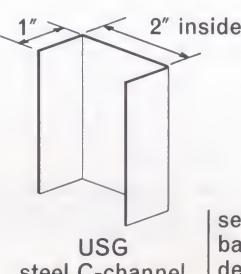
USG
steel J-strut



USG
steel E-stud

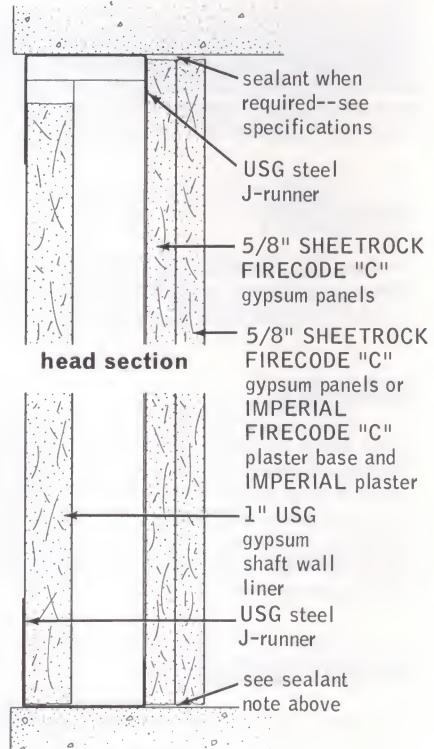


USG
steel H-stud

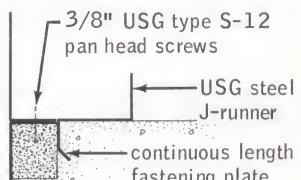


USG
steel C-channel

see "gypsum panels" and "plaster bases" product catalogs for full description on accessories

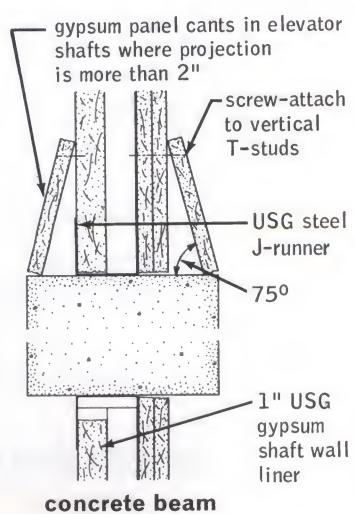
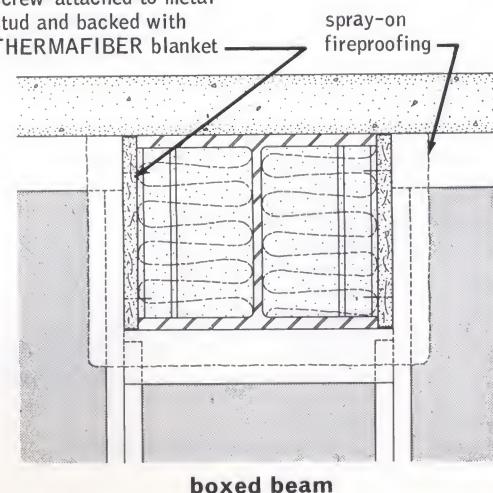
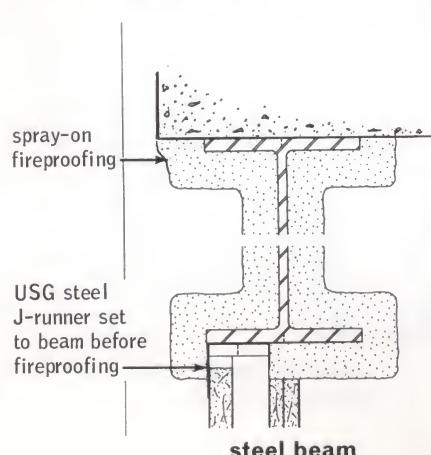
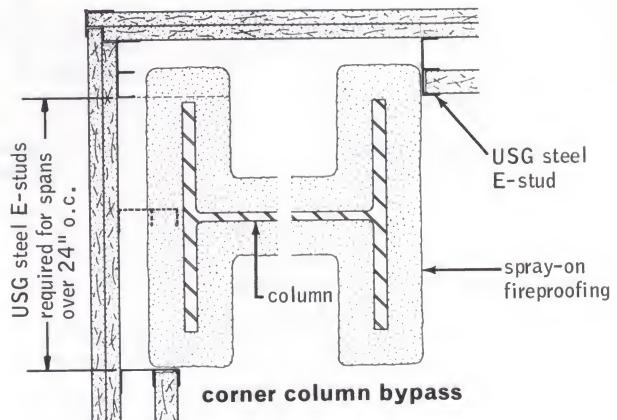
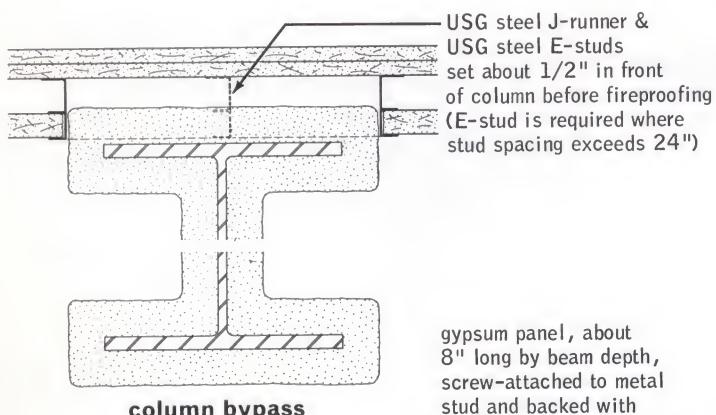
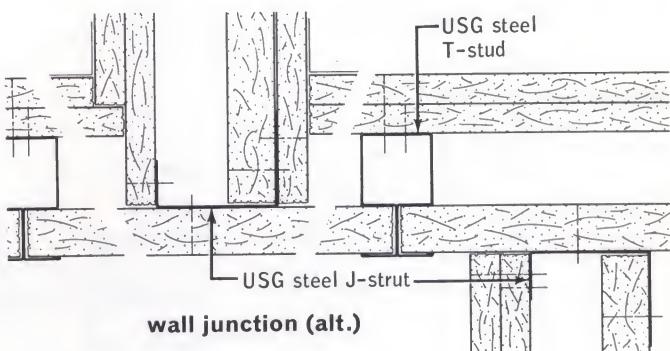
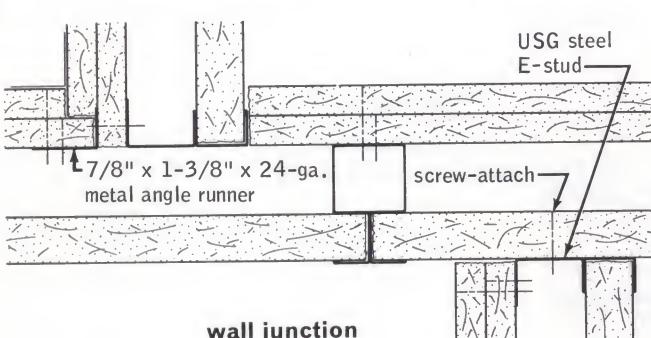
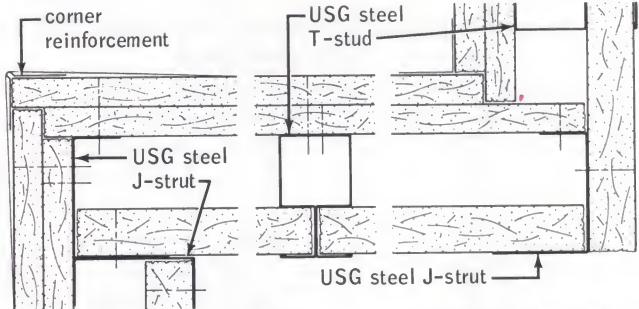
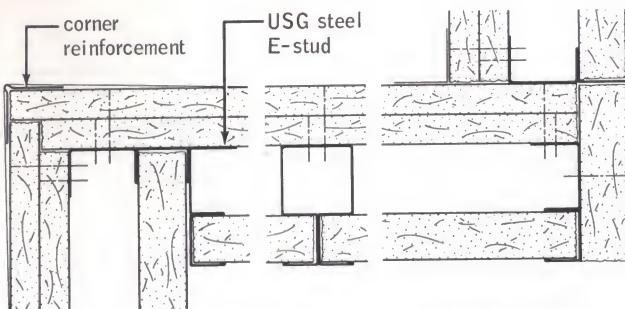


head section



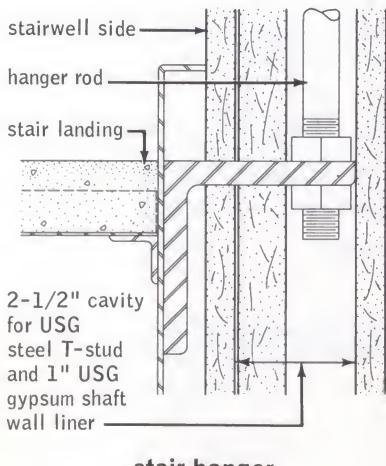
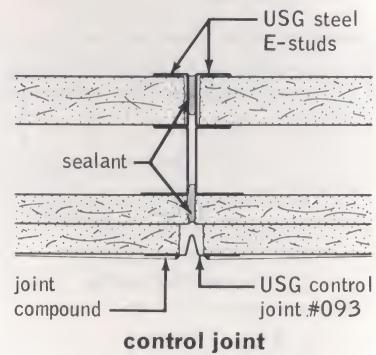
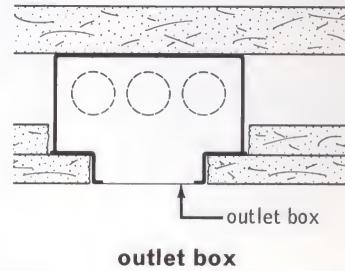
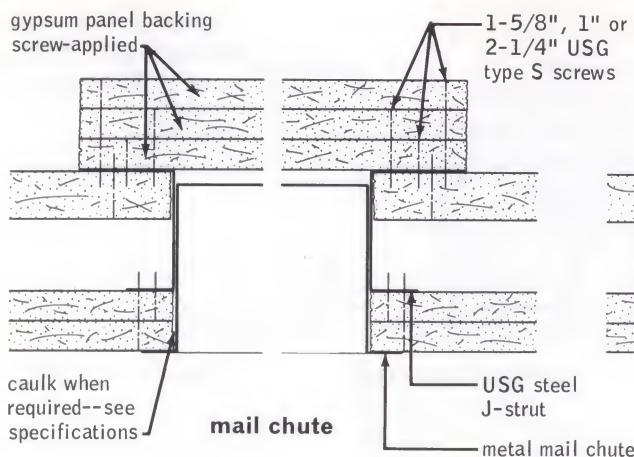
opt. base section

details/cavity shaft walls

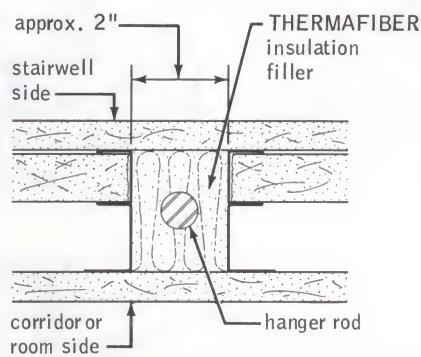
scale: $1\frac{1}{2}''$ & $3'' = 1'-0''$ 

details/cavity shaft walls

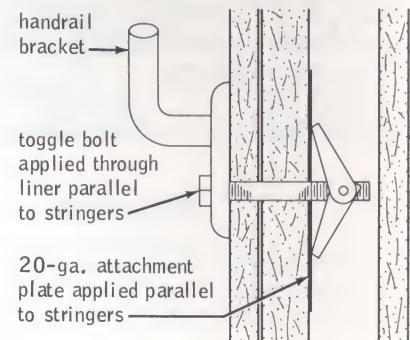
scale: 3" = 1'-0"



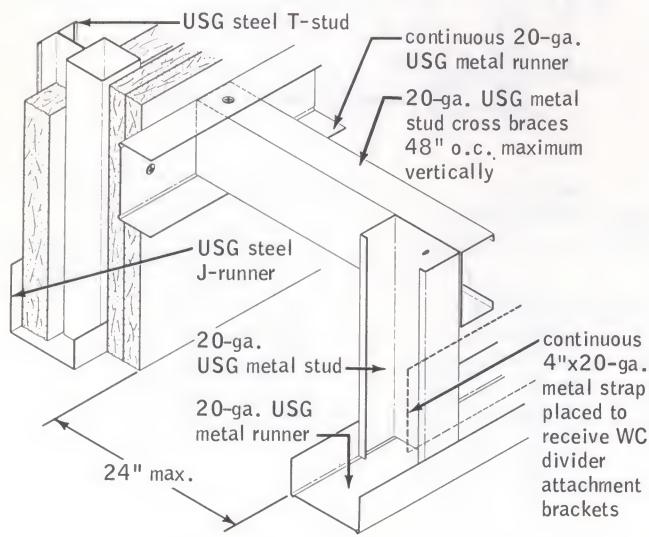
stair hanger rod application



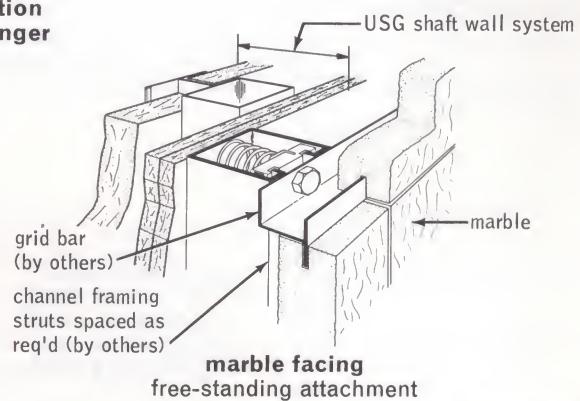
cross section at stair hanger



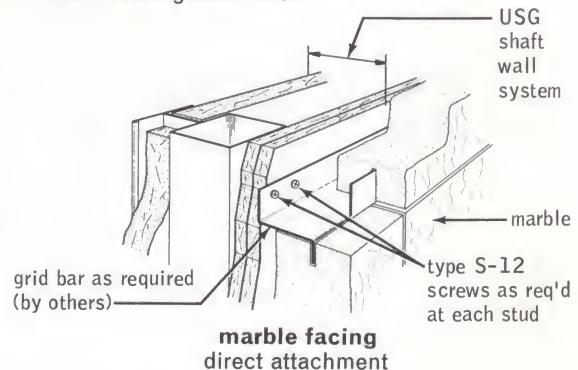
handrail application



metal stud chase wall



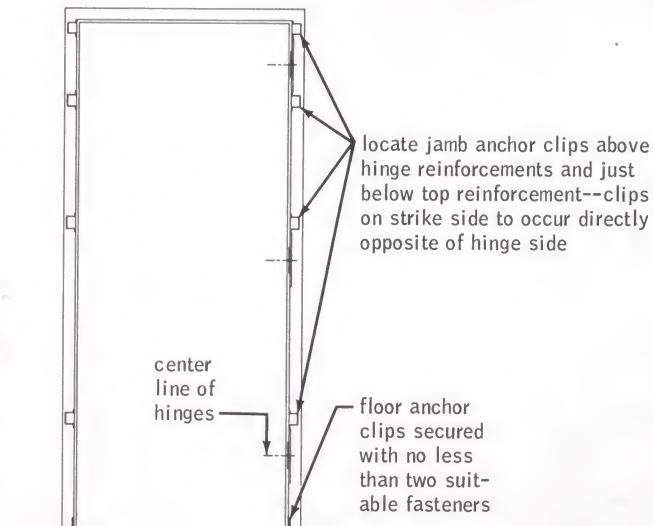
marble facing free-standing attachment



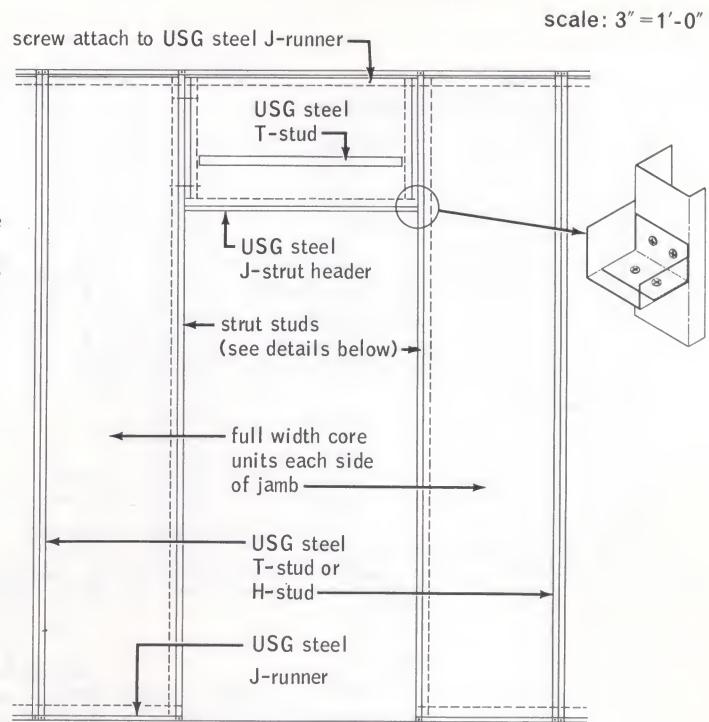
marble facing direct attachment

details/door frames

typical elevations

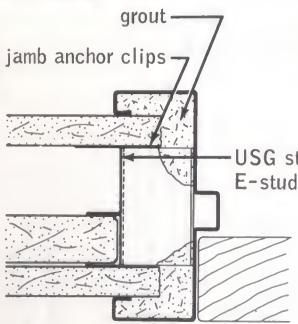


cross section thru frames

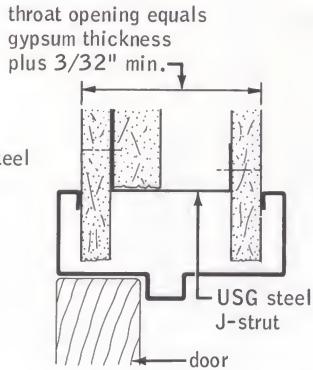


rough door opening

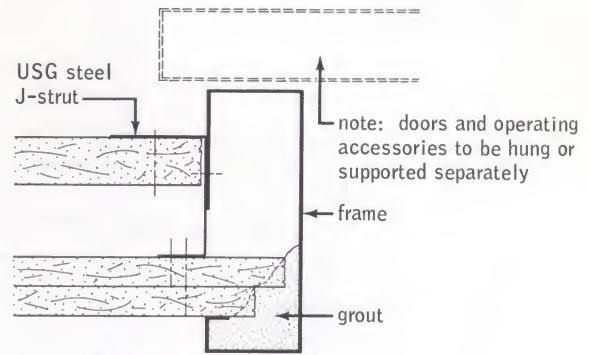
cavity shaft walls



hinged door jamb

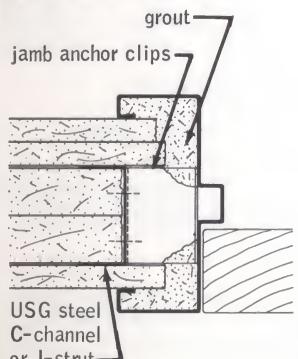


hinged door head

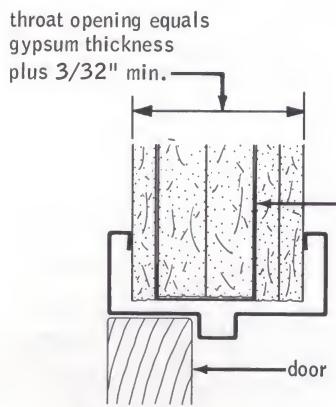


elevator door jamb

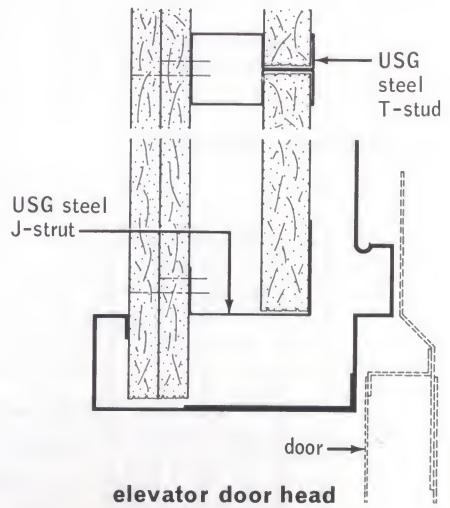
solid shaft walls



hinged door jamb



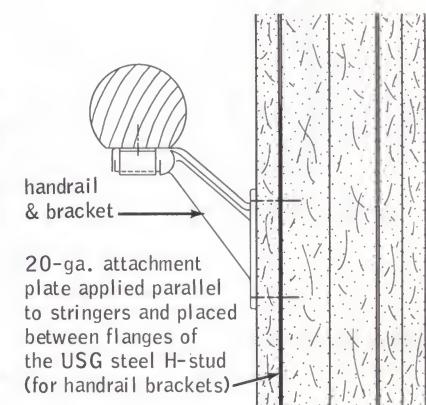
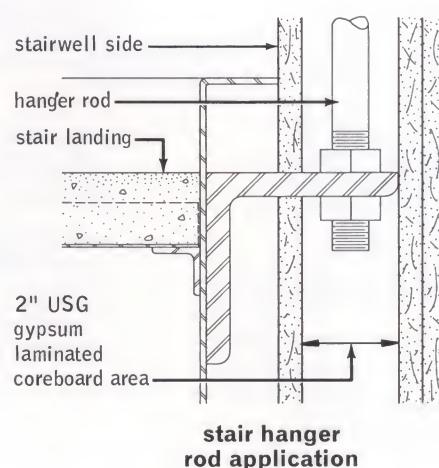
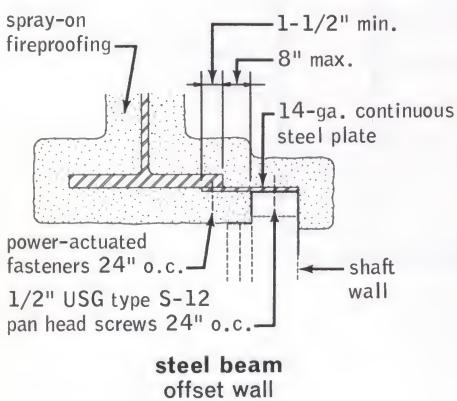
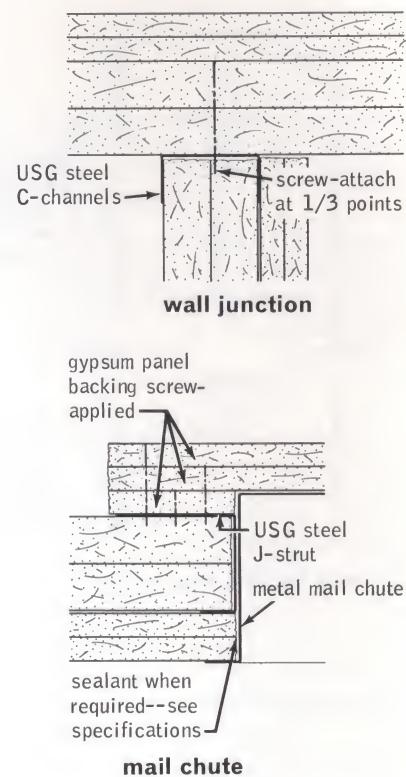
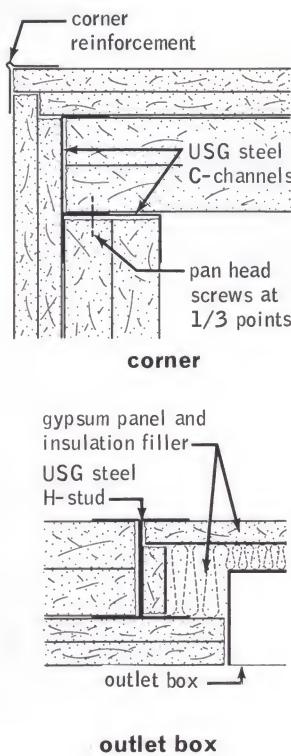
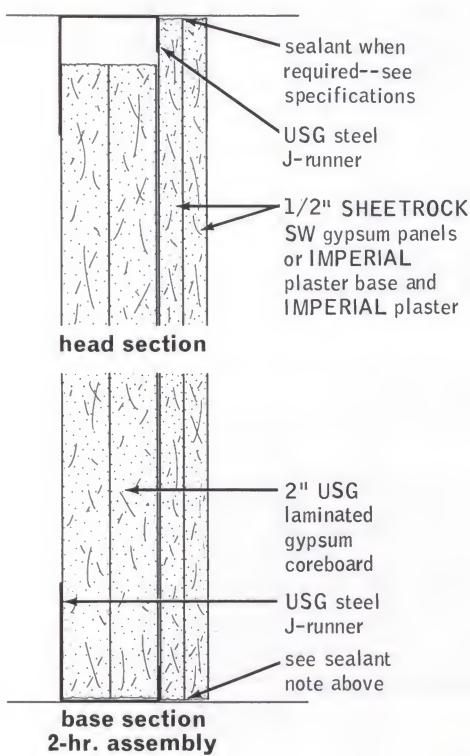
hinged door head



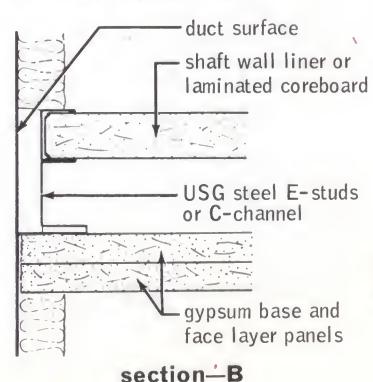
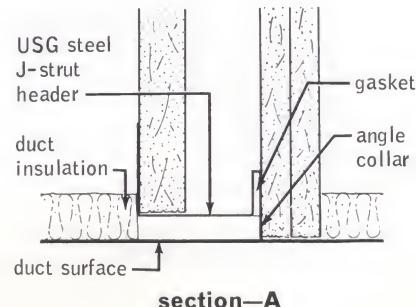
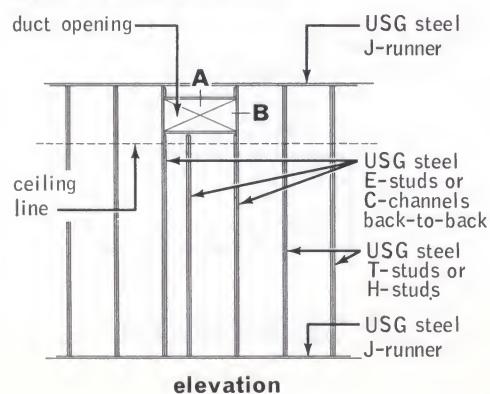
elevator door head

details/solid shaft walls

scale: 1½" & 3" = 1'-0"



typical duct penetration



design data

limiting heights—cavity shaft walls

stud type & size	metal gauge (l)	stud spacing	allowable deflection	ICBO App'l. 1495	air pressure load—psf			
					5	7.5	10	15
2½" T-Studs or double 2½" E-Studs	25	24"	1/120	14'10"	13'3"(f)	11'0"(f)	9'6"(f)	7'9"(f)
			1/240		12'6"(d)	11'0"(d)	9'6"(f)	7'9"(f)
			1/360		11'0"(d)	9'6"(d)	8'9"(d)	7'6"(d)
	20	24"	1/120	16'7"	18'0"(d)	15'3"(f)	13'3"(f)	10'9"(f)
			1/240		14'3"(d)	12'6"(d)	11'3"(d)	9'9"(d)
			1/360		12'6"(d)	10'9"(d)	9'9"(d)	8'6"(d)
double 4" E-Studs	25	24"	1/120	22'3"	23'0"(f)	18'9"(v)	14'0"(v)	9'3"(v)
			1/240		19'0"(d)	16'6"(d)	14'0"(v)	9'3"(v)
			1/360		16'6"(d)	14'3"(d)	13'0"(d)	9'3"(v)
	20	24"	1/120	23'1"	26'9"(d)	23'3"(d)	21'3"(d)	17'3"(f)
			1/240		21'3"(d)	18'6"(d)	16'9"(d)	14'9"(d)
			1/360		18'6"(d)	16'0"(d)	14'9"(d)	12'9"(d)
double 6" E-Studs	25	24"	1/120	25'6"	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)
			1/240		26'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)
			1/360		23'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)
	20	24"	1/120	30'3"	28'0"(c)	28'0"(c)	28'0"(c)	20'0"(v)
			1/240		28'0"(c)	26'3"(d)	24'0"(d)	20'0"(v)
			1/360		26'3"(d)	23'0"(d)	21'0"(d)	18'3"(d)

Limiting criteria: f—bending stress, d—deflection, v—end reaction shear, c—practical limitation. (1) Hot-dipped galvanized steel required for studs and runners. Specify 24-ga. runners with 25-ga. studs. Runner attachment spacing should not exceed 24" o.c.

limiting heights—solid shaft walls

stud type & size	metal gauge (l)	stud spacing	allowable deflection	air pressure load—psf			
				5	7.5	10	15
2" H-Studs	24	24"	1/240	10'0"(f)	8'0"(f)	—	—
			1/360	10'0"(f)	8'0"(f)	—	—
		16"	1/240	12'3"(f)	9'9"(f)	8'9"(f)	—
			1/360	12'3"(f)	9'9"(f)	8'9"(f)	—
		12"	1/240	14'3"(f)	11'3"(f)	10'0"(f)	8'3"(f)
			1/360	13'9"(f)	11'3"(f)	10'0"(f)	8'3"(f)
	22	24"	1/240	12'3"(f)	9'9"(f)	8'9"(f)	7'0"(f)
			1/360	12'0"(d)	9'9"(f)	8'9"(f)	7'0"(f)
		16"	1/240	15'0"(f)	11'9"(f)	10'6"(f)	8'9"(f)
			1/360	13'9"(d)	11'9"(d)	10'6"(f)	8'9"(f)
		12"	1/240	16'6"(d)	13'9"(f)	12'3"(f)	10'0"(f)
			1/360	14'3"(d)	13'3"(d)	11'6"(d)	10'0"(d)
	20	24"	1/240	14'0"(f)	11'0"(f)	10'0"(f)	8'0"(f)
			1/360	12'3"(d)	10'6"(d)	9'9"(d)	8'0"(f)
		16"	1/240	16'0"(d)	13'6"(f)	12'3"(f)	10'0"(f)
			1/360	14'0"(d)	12'0"(d)	11'3"(d)	9'9"(d)
		12"	1/240	17'0"(d)	14'6"(d)	13'6"(d)	11'6"(f)
			1/360	14'9"(d)	12'9"(d)	11'9"(d)	10'3"(d)
	18	24"	1/240	14'9"(d)	12'9"(d)	11'9"(d)	10'3"(d)
			1/360	13'0"(d)	11'0"(d)	10'3"(d)	9'0"(d)
		16"	1/240	17'0"(d)	14'6"(d)	13'6"(d)	11'9"(d)
			1/360	14'9"(d)	12'9"(d)	11'9"(d)	10'3"(d)
		12"	1/240	18'0"(d)	15'3"(d)	14'3"(d)	12'6"(d)
			1/360	15'9"(d)	13'6"(d)	12'6"(d)	10'9"(d)
	16	24"	1/240	15'6"(d)	13'3"(d)	12'3"(d)	10'9"(d)
			1/360	13'6"(d)	11'6"(d)	10'9"(d)	9'3"(d)
		16"	1/240	17'9"(d)	15'0"(d)	14'0"(d)	12'3"(d)
			1/360	15'6"(d)	13'3"(d)	12'3"(d)	10'9"(d)
		12"	1/240	18'9"(d)	16'0"(d)	15'0"(d)	13'0"(d)
			1/360	16'6"(d)	14'0"(d)	13'0"(d)	11'6"(d)

Limiting criteria: f—bending stress, d—deflection, v—end reaction shear. (1) Hot-dipped galvanized steel required for studs and runners. Runner attachment spacing should not exceed 24" o.c.

sound transmission loss—db

test no.	method	band center frequency—Hz																				STC	
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800	3150	4000	
BBN-711113	Lab	32	30	—	38	47	49	—	51	52	51	—	54	54	54	—	54	52	51	—	55	59	51
TL-71-21	Lab	20	29	—	38	39	41	—	45	47	47	—	48	48	48	—	46	45	45	—	44	45	44
TL-70-270	Lab	17	23	—	29	31	31	—	34	37	40	—	41	43	44	—	43	42	40	—	41	43	39
TL-68-70	Lab	32	29	—	29	30	30	—	31	33	35	—	38	40	42	—	42	42	44	—	47	49	38

design data/specifications

design properties—metal components

	stud size	metal gauge	wt./lb. per lin. ft.	S_x in. ³	I_x in. ⁴	lbs./end reaction
T-Stud	2½"	25 20	.834 1.300	.100 .195	.141 .268	130 300
double E-Stud	2½"	25 20	1.034 1.614	.132 .220	.180 .278	140 300
	4"	25 20	1.368 2.134	.296 .508	.650 1.030	140 300
	6"	25 20	1.718 2.680	.628 1.094	2.004 3.400	140 300
H-Stud	24	.724	.133	.137	350	
	22	.890	.165	.170	350	
	20	1.064	.196	.201	350	
	18	1.344	.259	.271	350	
	16	1.676	.318	.337	350	

notes to architect (continued from page 3)

anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 7), and screw-attached to studs.

All one-piece frames should be grouted after shaft wall liner or laminated coreboard is installed. Apply DURABOND or USG Ready-To-Use Joint Compound just before inserting face layer into frame. Do not terminate panels against trim return. Provide additional bracing where required by installing diagonal bracing from jamb strut-studs to structure.

10. Where Cavity Shaft Wall height exceeds 16 ft., liner panel end joints should be positioned within the upper and lower third-points of wall and studs should be screw-attached to runners. Also, joints in adjacent panels should be staggered top and bottom to prevent a continuous horizontal joint.

11. See U.S.G. Product Folders in this series: Gypsum Panels Folder SA-927 for shaft wall components and joint system specifications; Gypsum Plasters Folder SA-918 for plaster specifications; Plaster Bases & Accessories Folder SA-917 for lathing specifications; Paint Products Folder SA-933 for paint specifications.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather during joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

b. When low humidity, high temperatures and rapid drying conditions exist during IMPERIAL Plaster Base and Plaster

application, DURABOND Joint Compound and PERF-A-TAPE Reinforcement shall be used on all joints, internal corners, trim and corner beads and allowed to set and dry thoroughly before plaster application.

1.5 protection

All materials shall be suitably protected from the weather during installation to prevent damage to the shaft wall.

Part 2: products

2.1 materials

- a. Liner Board—1" USG Gypsum Shaft Wall Liner, beveled edge, 24" wide, lengths as required.
- b. Coreboard—2" USG Laminated Gypsum Coreboard, beveled edge, (12") (16") (24") wide, lengths as required.
- c. Faceboards—(½") (⅜") thick, 48" wide, (SHEETROCK SW) (SHEETROCK FIRECODE "C") Gypsum Panels, lengths as required.
- d. Plaster Base—(½") (⅜") thick, 48" wide, square edge (IMPERIAL) (IMPERIAL FIRECODE "C") Plaster Base, lengths as required.
- e. Laminating Adhesive—DURABOND Joint Compound-Taping or 90.
- f. Joint Treatment—DURABOND Joint Compound and PERF-A-TAPE Reinforcing Tape.
- g. Fasteners—USG Brand Screws: ¾" Type (S) (S-12) pan head; (1") (1 ¼") (1 ½") (2 ¼") (2 ¾") Type (S) (S-12) bugle head.
- h. USG Metal Trim—No. (200A) (200B) (401) (402) (701B).
- i. USG Corner Bead—(DUR-A-BEAD) (No. 900).
- j. USG Control Joint No. 093.
- k. USG Metal Furring Channel.
- l. RC-1 SHEETROCK Resilient Channels.
- m. USG Steel T-Studs, 1½" x 2½" x (25) (20)-ga., hot-dipped galvanized, lengths as required (select gauge from tables).
- n. USG Steel E-Studs, 1" x (2½") (4") (6") x (25) (20)-ga., hot-dipped galvanized, lengths as required (select from tables).
- o. USG Steel H-Studs, 2" x 2" x (24) (22) (20) (18) (16)-ga., hot-dipped galvanized, lengths as required (select gauge from tables).
- p. USG Steel C-Channels, 1" x 2" x (24) (22) (20) (18) (16)-ga., hot-dipped galvanized, lengths as required (select gauge from tables).
- q. USG Steel J-Runners, 1" x (2") (2½") (4") (6") x 2¼" x (24) (20) (16)-ga., hot-dipped galvanized, x 10' lengths (select gauge from tables).
- r. USG Steel J-Struts, (1") x (2") (2½") x 2" x (24) (20) (16)-ga., hot-dipped galvanized, x 10' lengths (for framing openings).
- s. Runner Fasteners, power-driven type, to withstand 193 lbs. single shear and 200 lbs. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (not available from U.S.G.).
- t. USG Acoustical Sealant.

Part 3: execution

3.1 cavity shaft wall erection

Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and 24" o.c. With steel frame construction, install runners and E-Studs on columns before steel is spray-fireproofed. Remove fireproofing from runners and E-Studs before installing shaft wall liner.

Cut liner board panels 1" less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed 14 ft. in height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels.

Use steel T-Studs and E-Studs $\frac{3}{8}$ " to not more than $\frac{1}{2}$ " less than floor-to-ceiling height and install between liner panels with liner inserted in the groove. Install full-length steel E-Studs over shaft wall liner at T-intersections, corners, door jambs, columns and both sides of closure panels. Frame openings cut within a liner panel with E-Studs around perimeter. For openings, frame with vertical E-Studs at edges, horizontal J-Strut at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

Install floor-to-ceiling steel E-Studs each side of steel door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two $\frac{3}{8}$ " type S-12 pan head screws. Over metal doors, install a cut-to-length section of J-Strut and attach to strut-studs with clip angles and $\frac{3}{8}$ " type S-12 screws.

Install RC-1 Resilient Channels horizontally to box side of studs, within 6" of floor and ceiling and max. 24" o.c. Attach channels to studs with $\frac{3}{8}$ " type S-12 screws driven through holes in mounting flange. Extend channels into all corners and attach to corner framing. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice. Install $\frac{1}{2}" \times 3"$ wide continuous gypsum filler strips to top and bottom runner.

For resiliently attached finish, apply base layer horizontally to resilient channels with end joints staggered; fasten with 1" type S screws 12" o.c. Apply face layer vertically with joints staggered and attach to channels with $1\frac{1}{8}$ " type S screws 12" o.c.

For double-layer finish, erect $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Gypsum Panel base layer horizontally one side of studs with end joints staggered. Fasten base layer panels to studs with 1" type (S) (S-12). Caulk perimeter of base layer panels.

Apply $\frac{5}{8}$ " SHEETROCK SW FIRECODE "C" Gypsum Panel face layer vertically over base layer with joints staggered and attached with $1\frac{1}{8}$ " type (S) (S-12) screws staggered from those in base, spaced 12" o.c. and driven into studs.

Where both sides of shaft wall are finished, apply $\frac{5}{8}$ " SHEETROCK SW FIRECODE "C" Gypsum Panel face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" type (S) (S-12) screws spaced 12" o.c. in field and 8" o.c. along vertical abutting edges. Stagger screws on abutting edges.

For triple-layer finish, erect base layer vertically one side of studs, mid layer horizontally with joints staggered and face layer vertically with joints staggered. Attach gypsum panels to studs with 1" type (S) (S-12) screws 24" o.c. for base layer, $1\frac{1}{8}$ " type (S) (S-12) screws 24" o.c. for mid layer and $2\frac{1}{4}$ " type (S) (S-12) screws 16" o.c. for face layer. Attach face panels to J-Runners with $2\frac{1}{4}$ " type (S) (S-12) screws 12" o.c.

Note—For 4-hr. assembly, erect steel runners, steel studs and liner panels as described in first four paragraphs, then continue construction as described below:

Position second layer liner panels vertically over studs and fasten to studs with $1\frac{1}{8}$ " type (S)(S-12) screws spaced 6" from top and bottom and 24" o.c. Apply $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Gypsum Panel layer vertically over liner panels and attach with $2\frac{1}{4}$ " type (S)(S-12) screws staggered from screws in liner panel layer, spaced 24" o.c. and driven into studs.

Install USG Metal Furring Channels horizontally over gypsum panel layer at ceiling and spaced 24" o.c. vertically. Fasten top channel to studs and runner with $2\frac{1}{4}$ " type (S)(S-12) screws spaced 12" o.c. and alternated on channel flanges. Fasten other channels to studs with screws spaced 24" o.c. in top channel flange.

Install second layer $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Gypsum Panels vertically over furring channels with vertical joints staggered 24" from joints in first layer. Fasten panels to channels with 1" type (S)(S-12) screws spaced 1" from vertical edges, 12" o.c. in top channel and 24" o.c. in other channels. Install face layer panels vertically over second layer with vertical joints staggered 24". Fasten panels to furring channels with $1\frac{1}{8}$ " type (S)(S-12) screws located $\frac{3}{4}$ " and 6" from edges and spaced 12" o.c. in between.

3.2 solid shaft wall erection

Position metal runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and 24" o.c. With steel frame construction, install runners and C-Channels on columns before steel is spray-fireproofed. Remove fireproofing from runners and C-Channels before installing coreboard and sealant.

Cut laminated coreboard panels 1" less than floor-to-ceiling height and erect vertically between J-Runners.

Cut metal H-Studs $\frac{3}{8}$ " to not more than $\frac{1}{2}$ " less than floor-to-ceiling height and install between coreboard panels with coreboards inserted in the groove. Install full-length metal C-Channels over coreboard panels at T-intersections, corners, door jambs, columns and both sides of closure panels. At corners, securely fasten adjacent C-Channels together with pan head screws driven at midpoint and 12" from top and bottom. Frame openings cut within a coreboard with C-Channels around perimeter. For openings, frame with vertical C-Channels at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

Install floor-to-ceiling-height metal C-Channels each side of steel door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two $\frac{3}{8}$ " type S-12 pan head screws. Over metal doors, install a cut-to-length section of J-Strut and attach to adjacent strut-studs with clip angles and $\frac{3}{8}$ " type S-12 screws.

For single-layer finish, install $\frac{5}{8}$ " (SHEETROCK SW Gypsum Panels) (IMPERIAL Plaster Base) vertically to one side of coreboard panels with joints staggered from joints in coreboard. Fasten face panels to H-Studs and C-Channels with 1" type (S) (S-12) screws spaced 12" o.c. and alternated in H-Stud flanges. Caulk perimeter of base layer panels where specified.

For double-layer finish, erect $\frac{1}{2}$ " SHEETROCK Gypsum Panel base layer vertically one side of coreboard panels with joints staggered from joints in coreboard. Fasten base layer panels to H-Studs and C-Channels with 1" type (S) (S-12) screws spaced 12" o.c. and alternated in H-Stud flanges. Caulk perimeter of base layer panels where specified.

Apply $\frac{1}{2}$ " (SHEETROCK SW Gypsum Panel) (IMPERIAL Plaster Base) face layer vertically over base layer with joints staggered and attached with $(1\frac{5}{16}')$ ($1\frac{1}{8}$) type (S) (S-12) screws. Space screws 12" o.c. and drive through base layer into studs and channels. When vertical joints do not fall over supports, apply adhesive to base layer in strips of four $\frac{1}{2}$ " beads spaced 2" o.c. with strips centered under face layer joint.

For double-layer furred panel finish, erect $\frac{5}{8}$ " SHEETROCK Gypsum Panel base layer vertically on one side of coreboard panels with joints staggered from joints in coreboard. Attach

base layer panels to H-Studs and C-Channels with 1" type (S) (S-12) screws spaced 12" o.c. and alternated in H-Stud flanges. Caulk perimeter of base layer where specified. Position USG Metal Furring Channels horizontally and space 24" o.c. vertically. Fasten channels through base layer into H-Studs with two 1" type (S) (S-12) screws at each channel-stud intersection. Apply $\frac{5}{8}$ " thick (SHEETROCK SW Gypsum Panel) (IMPERIAL Plaster Base) face layer vertically over furring channels and attach with 1" type S screws spaced 12" o.c.

3.3 accessory application

a. **Gypsum Panel Joints**—Finish all face layer joints and internal angles with DURABOND Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. **Plaster Base Joints**—Treat all plaster base joints, internal corners, trim and corner bead with DURABOND Joint System installed according to manufacturer's directions. Allow to dry thoroughly before finish plaster application.

c. **Corner Bead**—Reinforce all vertical and horizontal exterior corners with corner bead fastened with staples 9" o.c. on both flanges along entire length of bead.

d. **Metal Trim**—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 12" o.c.

e. **Screws**—Power-drive at least $\frac{3}{8}$ " from edges or ends of gypsum panels to provide uniform dimple $\frac{1}{32}$ " deep. In plaster base, set flush with surface without tearing face paper.

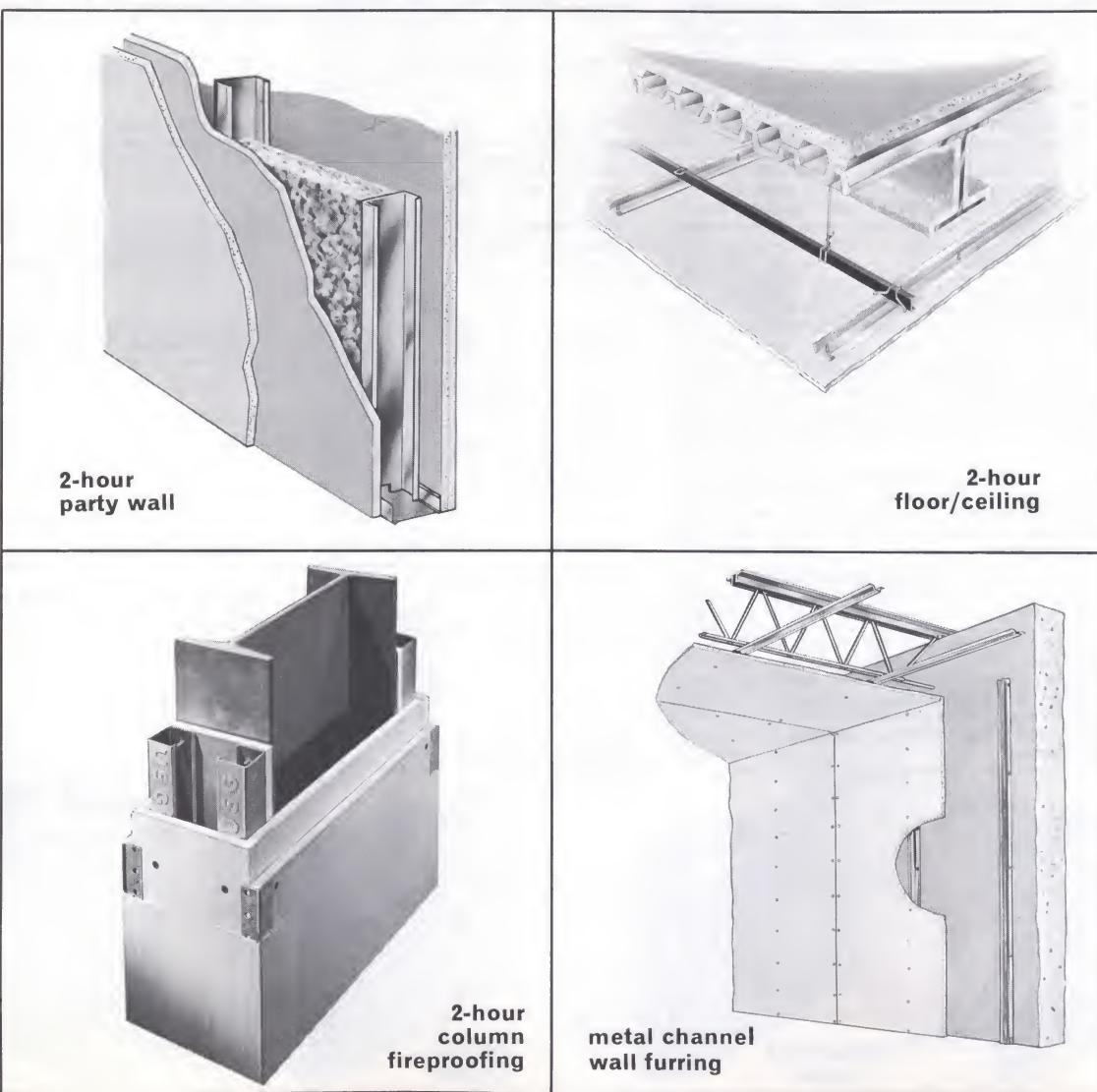
f. **Control Joints**—Break face layer behind joint. Attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, IMPERIAL, RED TOP, STRUCTO-LITE.

USG Cavity Shaft Walls, U.S. Patent No. 3,702,044.

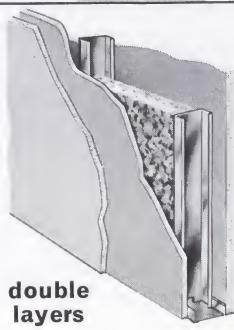
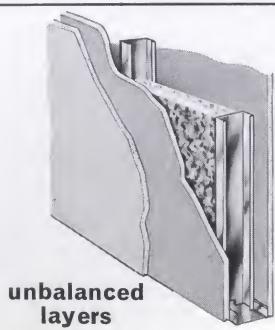
NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

**lightweight, fire and sound-resistant assemblies for partitions,
ceilings, column fireproofing, wall furring**



partitions/test data

fire rating	description	test no.	stc rating	comments	
			11-f 16-f		
1 hr.	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2½" USG studs 24" o.c.—single layer panels ea side appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—joints fin—perimeter caulked wt 5 width 3½"	T-3362-OSU TL-69-42 TL-65-158	(f) (s) (s)	45 48	TL-65-158 based on 3½" studs & 1" blkts.
1 hr. est	Met Stud—½" SHEETROCK FIRECODE gypsum panels—2½" USG studs 24" o.c.—1½" THERMAFIBER sound atten blkts—2 layer—base layer ¼" SHEETROCK panels screw att—½" face layer screw att—joints fin—perimeter caulked wt 7 width 4½"	CK-684-14 CK-684-13	(s) (s)	55 53	CK-684-13 based on ½" thick panels
1 hr. est	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2½" USG studs 24" o.c.—single layer panels one side appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 7 width 4"	BBN-711005 TL-69-153 TL-69-148 BBN-700726	(s) (s) (s) (s)	50 49 41 51	BBN-711005 based on lamin. face layer. TL-69-148 based on same construction without blkts. BBN-700726 based on 2%" foil-faced blkts.
1 hr. est	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—3½" USG studs 24" o.c.—single layer panels one side appl vert & screw att—2" THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 8 width 5½"	USG-241-ST-G&H	(s)	50	
1 hr.	Met Stud—2 layers ½" SHEETROCK gypsum panels ea side—1½" USG studs 24" o.c.—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 9 width 3½"	U of C 9-21-64 CK-654-40	(f) (s)		Sound test based on 2½" studs & 1½" blankets
1 hr.	Met Stud—½" SHEETROCK FIRECODE gypsum panels—3½" USG studs 24" o.c.—single layer panels vert or horiz appl & screw att 12" o.c.—joints fin—perimeter caulked wt 6 width 4½"	T-1174-OSU GA-WP-45-1 hr USG-17-FT-G&H	(f) (f) (s)		Basic 1-hr. corridor—fire tests based on screws 8" o.c. at vert. joints—WP-45 based on horiz. appl.
1 hr.	Met Stud—½" SHEETROCK FIRECODE gypsum panels—1½" USG studs 24" o.c.—single layer panels vert appl & screw att 12" o.c.—joints fin—perimeter caulked wt 5 width 2½"	U of C 7-31-62 TL-64-29	(f) (s)		Min. 1-hr. drywall partn.—fire test based on screws 8" o.c. at vert. joints
1 hr. est	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—3" USG studs 24" o.c.—single layer panels vert appl & screw att—1½" THERMAFIBER sound atten blkts—joints fin—perimeter caulked wt 5 width 4"	BBN-710310 BBN-710305	(s) (s)	45 39	BBN-710305 based on same construction without blankets
2 hrs.	Met Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2½" or 3½" USG studs 24" o.c.—1", 1½" or 2" THERMAFIBER sound atten blkts stapled—panels appl vert & joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked wt 10 width 4½"	UL Des U412 (was 28-2 hr) Field Test KSO-109006-a USG-114-FT-G&H CK-654-40	(f) (s) (s) (s)	55 54 53	Best value of drywall metal stud party walls in 50-54 stc range. CK-654-40 based on screw-attached face layer
2 hrs. est	Met Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2" USG studs 24" o.c.—panels appl vert & screw att—1½" THERMAFIBER sound atten blkts—joints fin—perim caulked wt 9 width 4"	TL-69-159 TL-69-155	(s) (s)	52 45	TL-69-155 based on same construction without blankets
2 hrs. est	Met Stud—½" SHEETROCK FIRECODE gypsum panels—3½" USG studs 24" o.c.—2 layer—base layer ½" USG min fiber sound dead bd ea side screw att—face layer panels (lamin & screw att—joints stag & fin—perimeter caulked wt 8 width 5½"	USG-103-FT-G&H Field Test KSO-109006-b	(s) (s)	52 50 52	
2 hrs.	Met Stud—2 layers ½" SHEETROCK FIRECODE gypsum panels plain or vinyl faced vert appl ea side—2½" or 3½" USG studs 24" o.c.—base layer screw att—face layer lamin or screw att—joints fin or unfin—perimeter caulked wt 12 width 6½"	UL Des U411 (was 11-2 hr) TL-60-113	(f) (s)		Excellent for corridors
2 hrs.	Met Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels—1½" USG studs 24" o.c.—2 layers ea side vert appl & screw att joints fin wt 9 width 3½"	U of C 6-15-65	(f)	N/A	Most economical 2-hour metal stud drywall partition
2 hrs. est	Met Stud Chase Wall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—1½" USG studs 24" o.c. in 2 rows spaced 6½" apart—½" gypsum panel gussets spanning chase att to studs at qtr points—panels appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—joints stag & fin—perimeter caulked wt 11 width 12"	USG-134-FT-G&H	(s)	55	



partitions

description

These lightweight, fire and sound-resistant assemblies consist of one or two layers of SHEETROCK SW Gypsum Panels screw-attached to metal framing. A specially designed self-tapping steel screw with a rust-inhibitive coating is used to attach the panels to the framing. The systems are completed with a U.S.G. joint system and decorating—both steps unnecessary in walls when predecorated vinyl-surfaced TEXTONE Gypsum Panels are used.

Gypsum panels for these assemblies are available in three thicknesses and six types (see Specifications). In two-layer construction USG Mineral Fiber Sound Deadening Board may be used as a base layer. SHEETROCK FIRECODE and FIRECODE "C" Gypsum Panels, with a specially formulated core, obtain higher fire ratings than regular SHEETROCK Panels (see table, page 2). These versatile panels are applied to USG Steel Studs or Metal Furring Channels to meet design requirements for fixed interior partitions—divider, corridor, party and chase walls; furred and suspended ceilings; wall furring and column fireproofing, as outlined below:

1. Partitions—Single layer of $\frac{1}{2}$ " or $\frac{5}{8}$ " thick SHEETROCK FIRECODE "C" Gypsum Panels applied to USG Steel Studs, set in runners, provides economical 1-hour fire-rated partitioning for corridors or within units. The studs are available in seven widths and two types (see Specifications, page 16) and lengths to suit job requirements. With double-layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels attached to $2\frac{1}{2}$ " or $3\frac{1}{8}$ " studs spaced 24" o.c., a 2-hour fire rating plus sound control suitable for party walls is available. Where added partition width is required, double rows of studs are erected to provide chase walls with up to 20 $\frac{3}{4}$ " net pipe chase width (see page 7).

"Series 4" Partitions, assemblies of uniform 4" thickness, require one door frame, gypsum panel and insulating blanket thickness throughout. Simplified design and installation in single-layer, double-layer and unbalanced construction are available to meet fire and sound requirements for party wall, corridor and divider partitions.

Shaft Walls—SHEETROCK Panels, assembled with gypsum core-board and specially shaped H-Studs or Box-T Studs, offer systems ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see separate Shaft Wall Folder SA-922 for applications).

2. Ceilings—Single-layer $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Panels screw-attached to furred or suspended USG Metal Furring

Channels 24" o.c. provide a 3-hour fire rating including beam protection (see page 15). The systems are also suitable for separate beam protection and for exterior ceilings and soffits with USG Exterior Gypsum Ceiling Board facings.

3. Wall Furring—With Foil-Back SHEETROCK Panels screwed to USG Metal Furring Channels, this construction provides an excellent vapor barrier and offers significant insulating value as exterior wall furring (see page 10). SHEETROCK Panel application to USG Z-Furring Channels with semi-rigid insulation provides a fully insulated wall at a cost competitive with many non-insulated furred walls (see page 11).

4. Column Fireproofing—SHEETROCK FIRECODE "C" Gypsum Panels, held in place by a combination of wire, screws, steel studs, corner bead and joint compound, offer lightweight, compact fire protection for steel columns (see page 9).

function and utility

Adaptable to virtually every type of new construction—commercial, institutional, industrial and residential—or in modernization to provide smooth, durable interior surfaces.

Fire Resistant—Constructed of noncombustible components. Established fire ratings available to meet design requirements; partitions up to 2 hours, ceilings up to 3 hours including beam, column fireproofing up to 4 hours.

Sound Isolation—STC ratings up to 55 for double-layer and 48 for single-layer partitions; 54 for single-layer ceilings. THERMAFIBER Sound Attenuation Blankets are used where greater sound isolation is desired.

Lightweight—These thin drywall assemblies weigh only 5 to 12 psf, reduce dead load and save floor area.

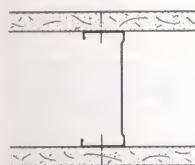
Economical—Low material cost and speed of erection provide realistic and competitive construction costs.

limitations

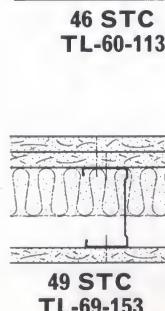
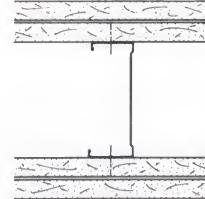
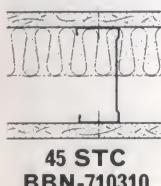
1. Non-load bearing.
2. These assemblies should not be used where exposed to excessive moisture or humidity.
3. Maximum frame spacing is 24" o.c.
4. In ceiling design, certain precautions concerning construction, isolation and ventilation are necessary for good performance (see Specifications, page 16).

sound-tested assemblies

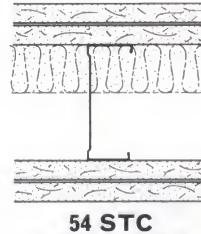
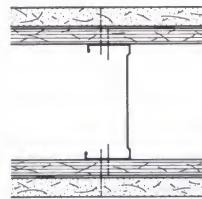
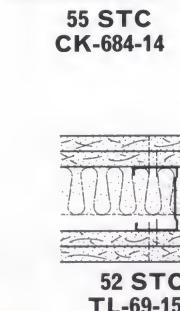
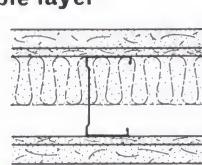
single layer



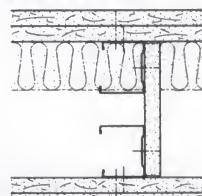
"series 4" partitions



double layer



chase wall



technical data

structural properties

stud width	I in. ⁴ x-x	S in. ³ x-x	R in. x-x
USG Steel Studs (Standard)			
1½"	0.043	0.047	0.689
2"	0.069	0.062	0.837
2½"	0.115	0.082	1.028
3"	0.174	0.105	1.213
3½"	0.269	0.135	1.304
4"	0.338	0.154	1.316
6"	0.324	0.146	1.481
20-ga. USG Steel Studs			
2"	0.126	0.123	0.820
2½"	0.210	0.164	1.012
3"	0.320	0.209	1.197
3½"	0.497	0.269	1.422
4"	0.626	0.307	1.553
6"	0.864	0.396	2.076

limiting height—"series 4" partitions

stud spacing	allow. defl.	one layer, 30ST5 studs	unbalanced, 212ST5 studs	two layers, 20ST5 studs
16"	1/120 1/240	16'9" f 14'9" d	14'9" f 13'9" d	12'9" f 12'6" d
24"	1/120 1/240	13'9" f 13'0" d	12'0" f 12'0" d	10'6" f 10'6" f

Limiting height for ½" or ¾" thick panels and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

limiting height—chase wall partitions

stud style	stud width	stud spacing	allow. defl.	one layer	two layers
158ST5	1½"	16"	1/120 1/240	15'9" f 14'0" d	15'9" f 14'0" d
		24"	1/120 1/240	13'0" f 12'3" d	13'0" f 12'3" d
212ST5	2½"	16"	1/120 1/240	21'0" f 18'6" d	21'0" f 20'3" d
		24"	1/120 1/240	17'0" f 16'3" d	17'0" f 17'0" f
358ST5	3½"	16"	1/120 1/240	26'9" f 23'9" d	26'9" f 25'9" d
		24"	1/120 1/240	22'0" f 20'9" d	22'0" f 22'0" f

Limiting height for ½" or ¾" thick panels and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

limiting height—metal stud assemblies

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
USG Steel Studs (Standard)						
158ST5	1½"	16"	1/120 1/240	11'3" f 10'0" d	11'3" f 11'3" f	10'0" f 8'6" d
		24"	1/120 1/240	9'3" f 8'9" d	9'3" f 9'3" f	8'3" f 7'6" d
212ST5	2½"	16"	1/120 1/240	14'9" f 13'0" d	14'9" f 14'3" d	12'6" f 11'6" d
		24"	1/120 1/240	12'0" f 11'6" d	12'0" f 12'0" f	8'3" f 7'6" d
358ST5	3½"	16"	1/120 1/240	19'0" f 16'9" d	19'0" f 18'0" d	15'3" f 15'3" f
		24"	1/120 1/240	15'6" f 14'9" d	15'6" f 15'6" f	12'6" f 12'6" f
40ST5	4"	16"	1/120 1/240	20'3" f 18'0" d	20'3" f 19'3" d	16'3" f 16'3" f
		24"	1/120 1/240	16'6" f 15'9" d	16'6" f 16'6" f	13'3" f 13'3" f
60ST5	6"	16"	1/120 1/240	19'9" f 19'9" f	19'9" f 19'9" f	15'0" f 15'0" f
		24"	1/120 1/240	16'0" f 16'0" f	16'0" f 16'0" f	12'3" f 12'3" f

20-ga. USG Steel Studs

stud style	stud width	allow. defl.	one layer, 20ST10 studs	unbalanced, 212ST10 studs	two layers, 20ST10 studs
20ST10	2"	16"	1/120 1/240	16'0" d 12'9" d	18'0" f 14'6" d
		24"	1/120 1/240	14'0" d 11'0" d	14'9" f 13'0" d
212ST10	2½"	16"	1/120 1/240	17'6" d 13'9" d	19'9" d 15'9" d
		24"	1/120 1/240	15'3" d 12'0" d	17'0" f 13'9" d
30ST10	3"	16"	1/120 1/240	21'0" d 16'9" d	23'3" d 19'9" d
		24"	1/120 1/240	18'6" d 14'6" d	19'3" f 16'3" d
358ST10	3½"	16"	1/120 1/240	23'0" d 18'3" d	25'3" d 20'0" d
		24"	1/120 1/240	20'0" d 16'0" d	21'9" f 17'6" d
40ST10	4"	16"	1/120 1/240	24'9" d 19'6" d	27'0" d 21'6" d
		24"	1/120 1/240	21'6" d 17'0" d	23'3" f 18'9" d
60ST10	6"	16"	1/120 1/240	27'6" d 21'9" d	32'0" d 25'6" d
		24"	1/120 1/240	24'0" d 19'0" d	24'9" f 22'3" d

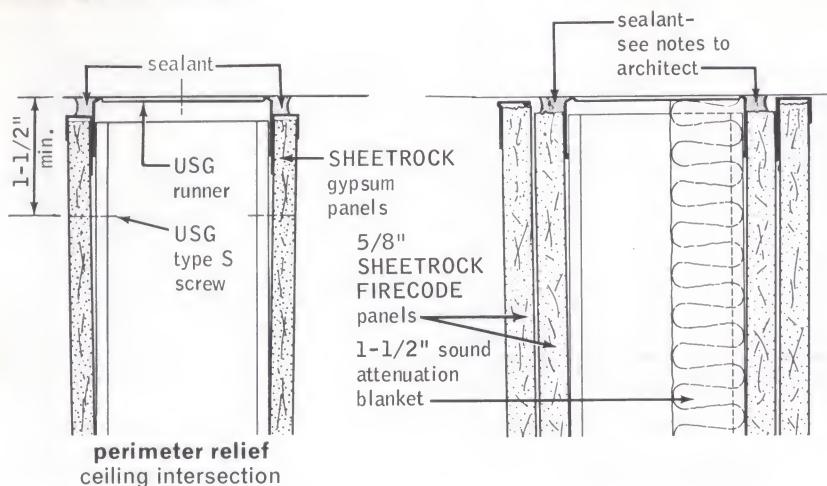
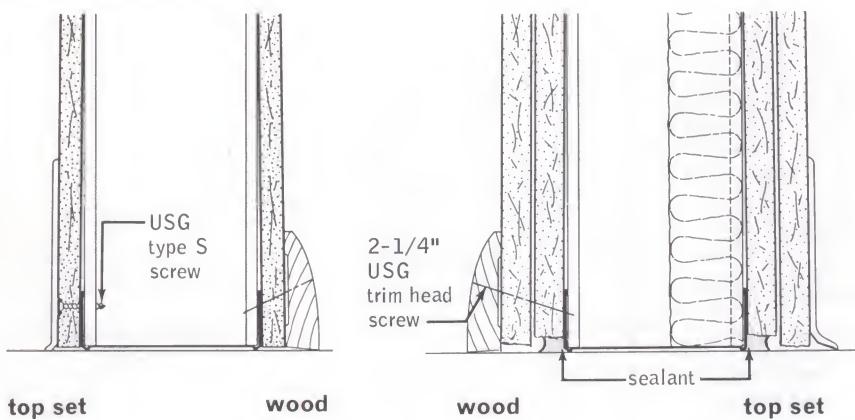
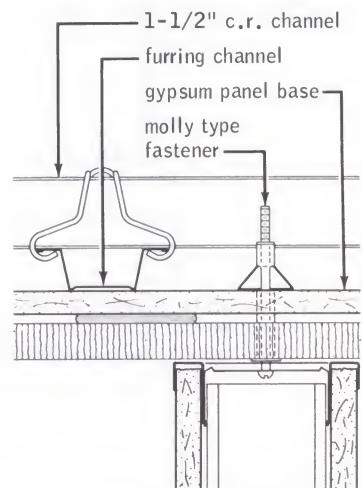
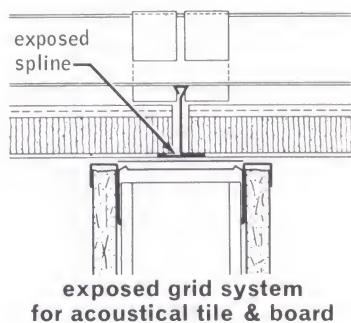
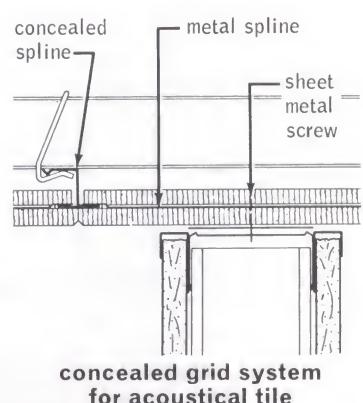
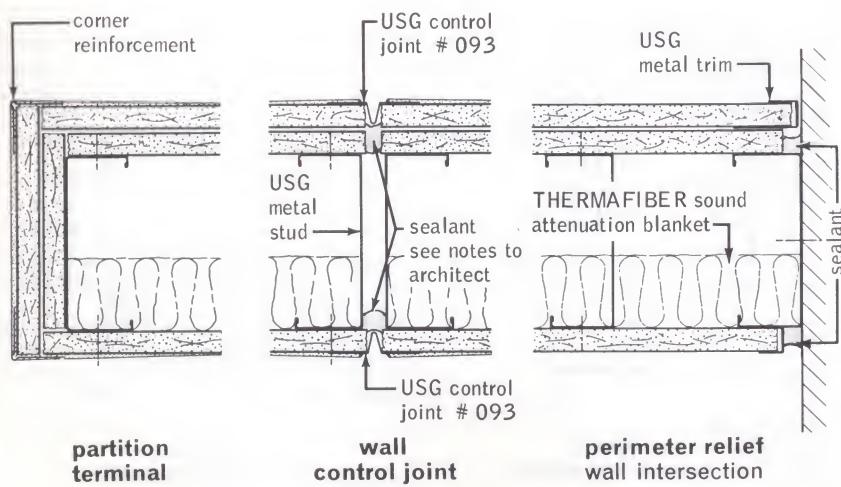
Limiting height for ½" or ¾" thick panels and 5 psf uniform load perpendicular to partition or furring. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

sound transmission loss—db

test no.	method	band center frequency—Hz																		STC			
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800			
CK-684-14	Lab	31	40	—	41	47	50	—	53	57	59	—	60	63	63	—	62	60	59	—	61	65	55
KSO-109006-a	Field	36	—	47	—	47	—	49	—	51	—	53	—	57	—	59	—	57	—	55	—	62	55
USG-134-FT-G&H	Lab	33	—	43	—	48	—	49	—	56	—	57	—	60	—	60	—	63	—	60	—	60	55
USG-114-FT-G&H	Lab	32	—	39	—	44	—	48	—	55	—	56	—	57	—	59	—	62	—	58	—	56	54
CK-684-13	Lab	29	38	—	40	46	49	—	54	56	58	—	60	62	63	—	61	62	61	—	63	64	53
CK-654-40	Lab	36	35	—	37	43	47	—	51	54	55	—	57	56	56	—	59	58	58	—	56	58	53
TL-69-159	Lab	30	37	—	40	42	48	—	52	53	54	—	55	57	58	—	60	59	52	—	49	52	52
KSO-109006-b	Field	31	—	37	—	42	—	44	—	51	—	54	—	59	—	59	—	58	—	55	—	63	50
USG-103-FT-G&H	Lab	34	—	36	—	44	—	46	—	52	—	56	—	57	—	60	—	53	—	55	—	52	52
BBN-700726	Lab	32	33	—	38	44	45	—	49	52	52	—	57	59	58	—	61	62	54	—	51	51	51
BBN-711005	Lab	35	32	—	40	45	49	—	52	51	48	—	51	50	50	—	52	52	49	—	48	52	50
USG-241-ST-G&H	Lab	34	37	—	41	41	44	—	47	50	54	—	55	56	57	—	58	49	46	—	46	52	50
TL-69-153	Lab	28	36	—	37	38	44	—	48	52	54	—	55	57	59	—	60	58	51	—	47	49	49
TL-65-158	Lab	27	29	—	35	37	40	—	43	48	52	—	53	52	54	—	55	54	49	—	44	47	48
BBN-710310	Lab	27	30	—	34	37	40	—	44	45	47	—	49	49	49	—	49	45	41	—	43	45	45
TL-69-42	Lab	21	29	—	32	35	40	—	45	48	51	—	53	55	57	—	58	56	49	—	42	43	45

details

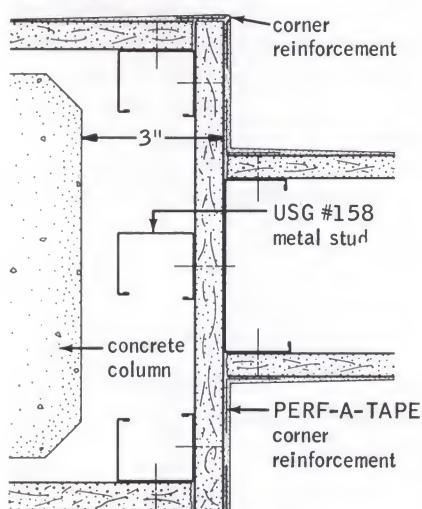
scale: 3" = 1'-0"

ceiling attachments**floor attachments****attachment of partition to ceiling****adhesively applied acoustical tile****exposed grid system
for acoustical tile & board****wall plan sections****concealed grid system
for acoustical tile**

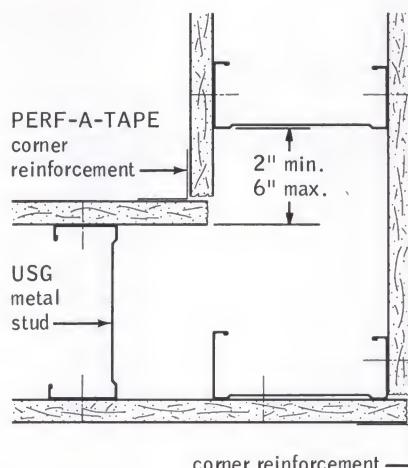
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scale: 3" = 1'-0"

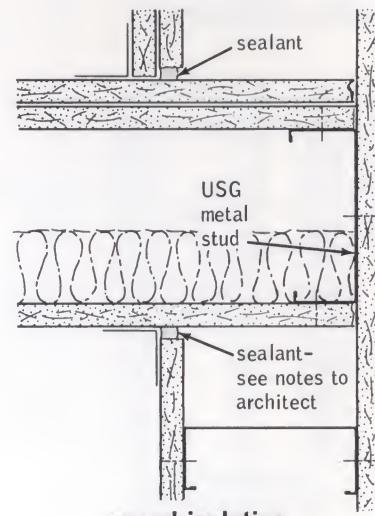
wall plan sections



partition relief
column intersection

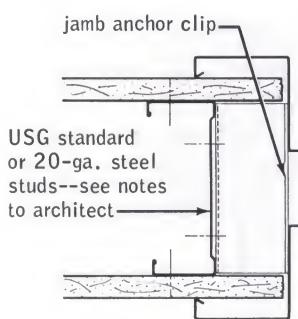


partition corner

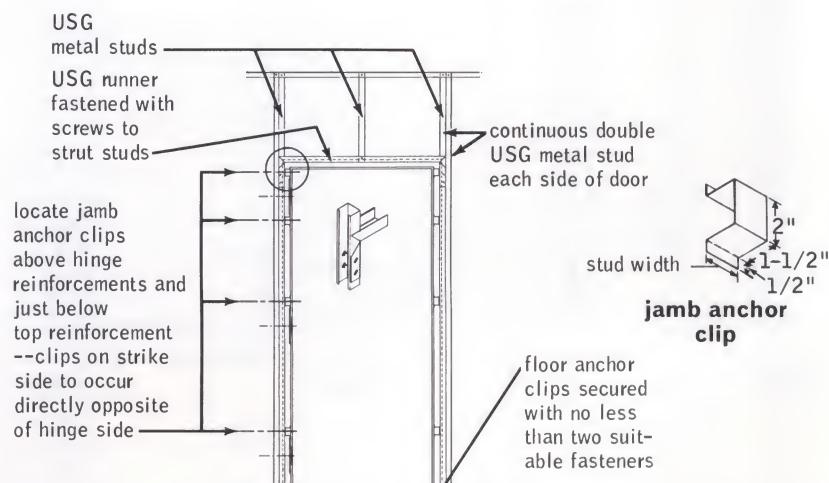


sound-isolating
partition intersection

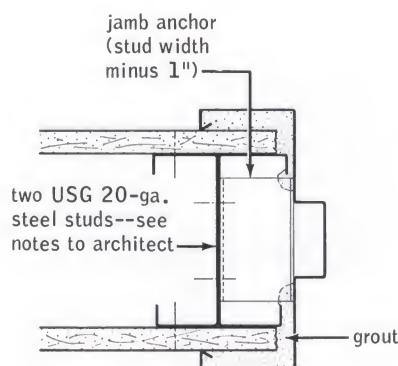
metal door frames



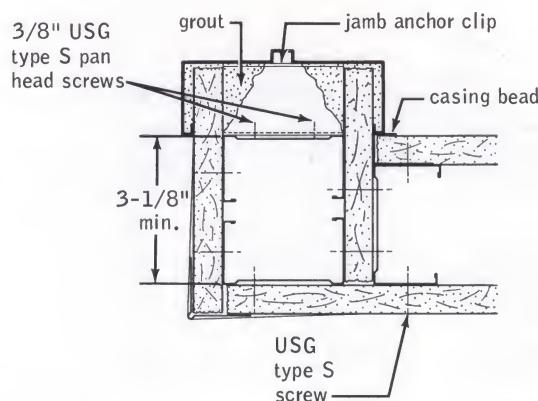
jamb
standard doors



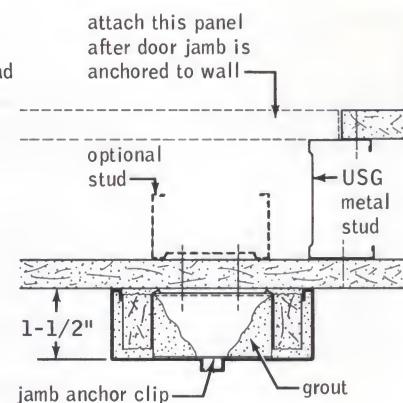
elevation
cross section through frame



jamb
heavy doors



jamb
corner intersection



jamb
wall intersection

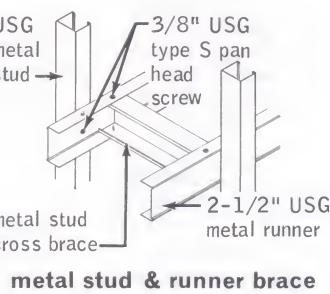
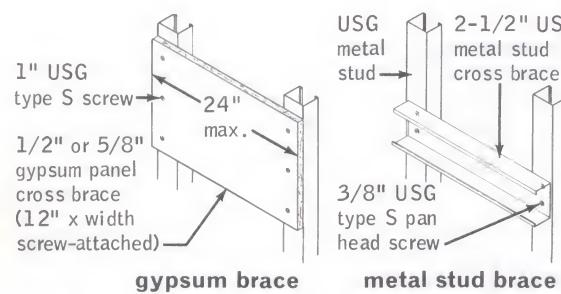
details

USG metal stud chase wall

Chase walls provide vertical shafts where greater core widths are needed for pipe chase enclosures and other service installations. They consist of a double row of metal studs with gypsum panel cross braces between rows. Double-layer $\frac{1}{2}$ " SHEETROCK SW Gypsum Panels are screw-applied on both sides of studs and $\frac{1}{2}$ " THERMAFIBER Sound Attenuation Blankets are stapled to the back side of one base layer. The assembly offers 55 STC, suitable for party walls, and a 2-hour fire-resistance rating when $\frac{1}{2}$ " SHEETROCK SW FIRECODE "C" Gypsum Panels are used.

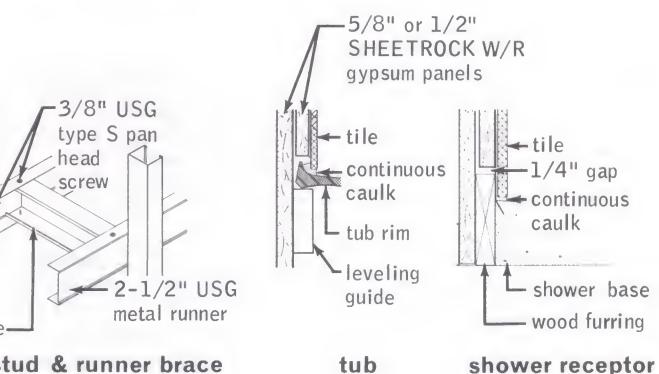
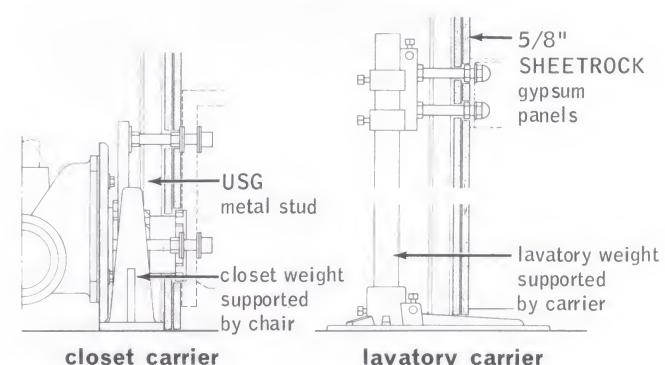
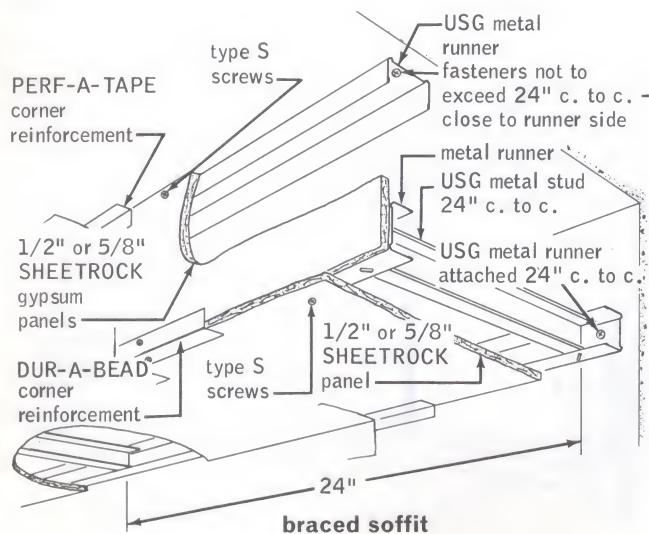
As an alternate, $2\frac{1}{2}$ " metal stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, metal stud cross braces 24" o.c. are anchored to continuous horizontal $2\frac{1}{2}$ " runners screw-attached to chase wall studs.

Limiting thickness is 24"; vertical brace spacing 48" o.c. max.; limiting heights are shown on page 4. Other chase walls providing greater height may be constructed with wider or heavier metal studs (see tables, page 4, for design data). Minimum panel size is $\frac{1}{2}$ " x 4' x ceiling height.



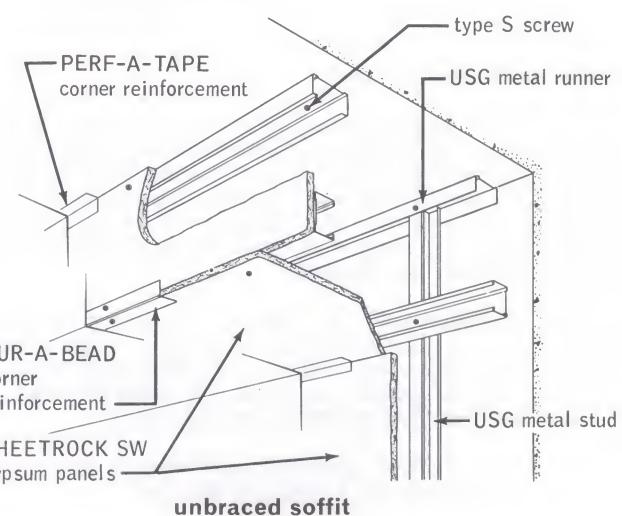
USG drywall soffit

This assembly consists of galvanized steel channel runners and studs faced with SHEETROCK Gypsum Panels, screw attached. It is a lightweight, fast and economical method of filling over cabinets or lockers and of housing overhead ducts, pipes or conduits. The braced system permits constructing soffits with depths of 48" and widths to 72" without supplementary vertical studs. The unbraced system is for soffits up to 24" x 24".



(1) The construction is not designed to support loads other than its own dead weight and should not be used where it may be subjected to excessive abuse.

(2) The double-layer system and $\frac{3}{8}$ " thick gypsum panels are not recommended for this construction.

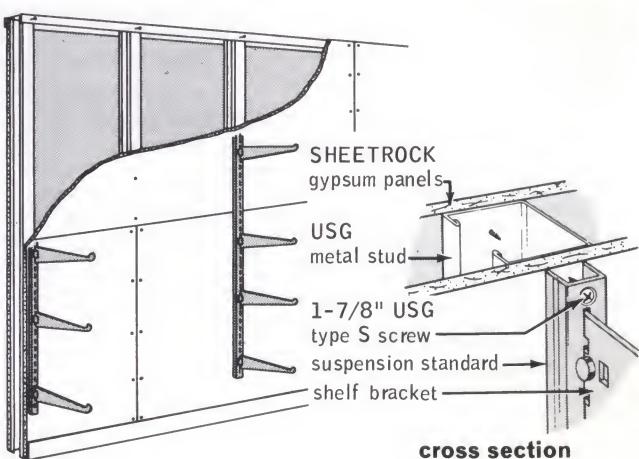
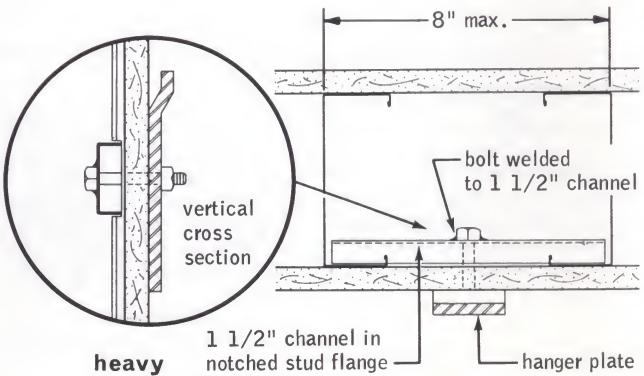
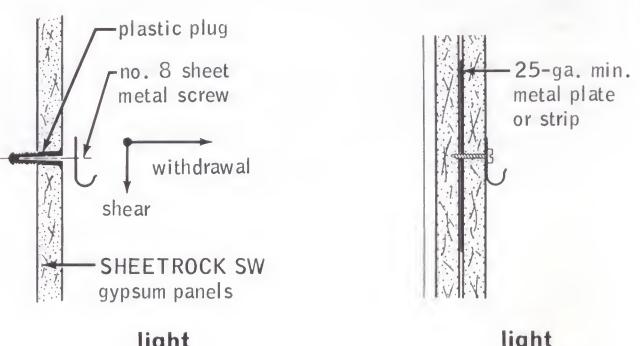
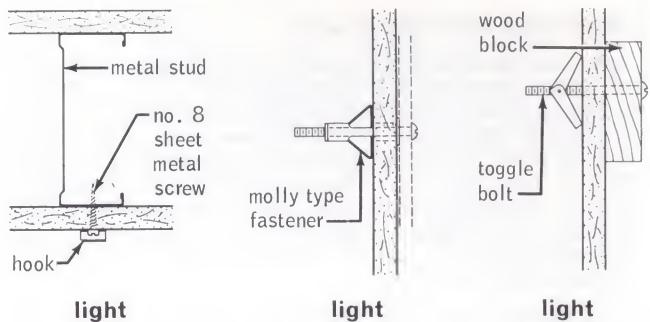
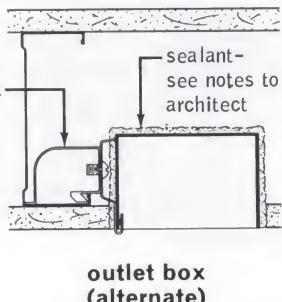
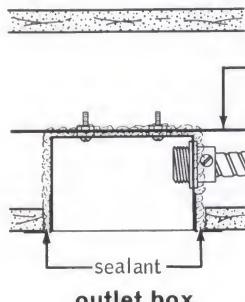
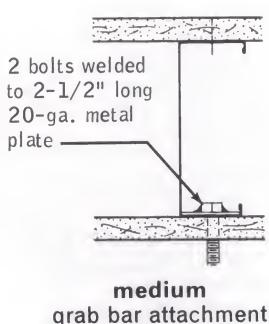
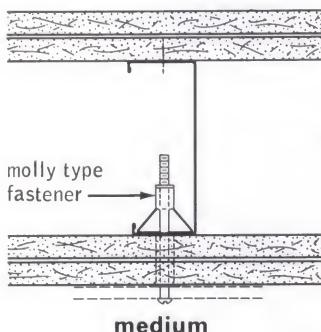


fixture attachments

scale: 3" = 1'-0"

fastener load table

type fastener or attachment	allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
No. 8 sheet metal screw through SHEETROCK into metal stud	50	80
1/4" molly bolt into 1/2" SHEETROCK only	35	80
1/4" toggle bolt into 1/2" SHEETROCK only	40	60
No. 8 sheet metal screw in plastic plug	20	40
No. 8 sheet metal screw into 25-ga. sheet metal plate	60	100
molly bolt through SHEETROCK K into metal stud 1/8" diam. 5/16" diam.	70 80	100 125
bolts welded to 20-ga. plate 5/16" diam. 1/4" diam.	175 200	200 250
plumber's bracket attached with 1/4" bolts and 1 1/2" channels	200	200



USG shelf-wall system

This system provides load-carrying walls for shelving in stores, offices, schools and other applications where required. Incorporating simple, quickly erected, economical metal stud components with Garey shelf brackets, standards and accessories, the assembly offers all the advantages of metal stud-drywall construction plus the structural strength to support shelving and merchandise.

In this assembly, 3 5/8" USG Steel Studs spaced no more than 24" o.c. are securely fastened to floor and ceiling runners and surfaced with either single or double-layer SHEETROCK Gypsum Panels. Slotted standards are screw-attached to studs or steel reinforcing inserted between layers.

The system provides a load-carrying partition but is not structurally load-bearing. Limiting height: 16'.

column fireproofing/test data

fire rating	column type	description	test no.	comments	
2 hrs.	W10 X49	Gypsum Drywall Fireprfg—½" SHEETROCK FIRECODE "C" panels around col—double layer over ea flange end—double layer on flange faces separ by USG #158 met studs & screw att—met beads on corners—joints fin†	UL Des X518 (was 10-2 hr)	(f)	
2 hrs.	W14 X228	Gypsum Drywall Fireprfg—½" SHEETROCK FIRECODE "C" panels around col—panels screw att to #158 met studs at col corners—met corner beads—joints fin†	UL Des X521 (was 23-2 hr)	(f)	
3 hrs.	W10 X49	Gypsum Drywall Fireprfg—3 layers ½" SHEETROCK FIRECODE "C" panels around col—triple layer over ea flange end—inner layers on flange face separ by #158 met studs & screw att—met beads on corners—joints fin†	UL Des X515 (was 41-3 hr)	(f)	
3 hrs.	W14 X228	Gypsum Drywall Fireprfg—½" SHEETROCK FIRECODE "C" panels around col—double layer over ea web face—panels screw att to #158 met studs at col corners—met corner beads—joints fin†	UL Des X514 (was 40-3 hr)	(f)	
4 hrs.	W14 X228	Gypsum Drywall Fireprfg—2 layers ½" SHEETROCK FIRECODE "C" panels around col—panels screw att to #158 met studs at col corners—met corner beads—joints fin†	UL Des X507 (was 48-4 hr)	(f)	
4 hrs.	W10 X49	PYROBAR Gypsum Tile & Drywall Fireprfg—2" solid tile around col—tile banded 2" from ea end—contin met angles screw att to bands—1 layer ½" SHEETROCK FIRECODE "C" panels screw att to angles—met corner beads—joints fin†	UL Des X502 (was 31-4 hr) UL Des X504 (was 34-4 hr)	(f) (f)	UL Design X504 based on 3" hollow tile

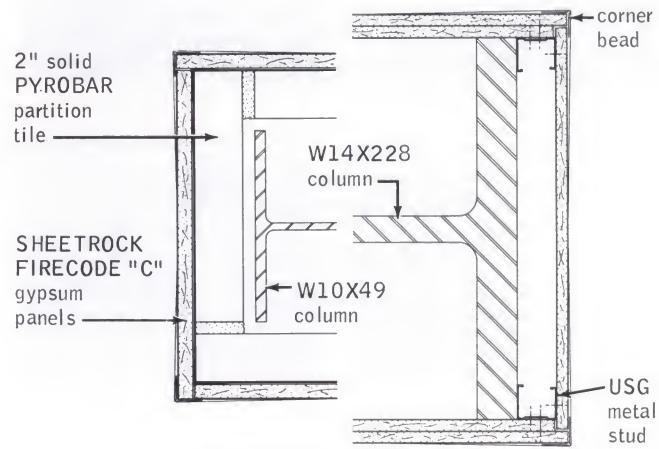
†Fire rating also applies with IMPERIAL FIRECODE "C" Plaster Base and veneer plaster surface.

description

Drywall systems for column fireproofing consist of layers of SHEETROCK FIRECODE "C" Gypsum Panels held in place by a combination of wire, steel studs, screws and metal angles. The assemblies provide lightweight, thin, compact steel column fire protection of up to four hours depending on the construction. Increased fire protection of primary structural framing members usually permits lower insurance premiums.

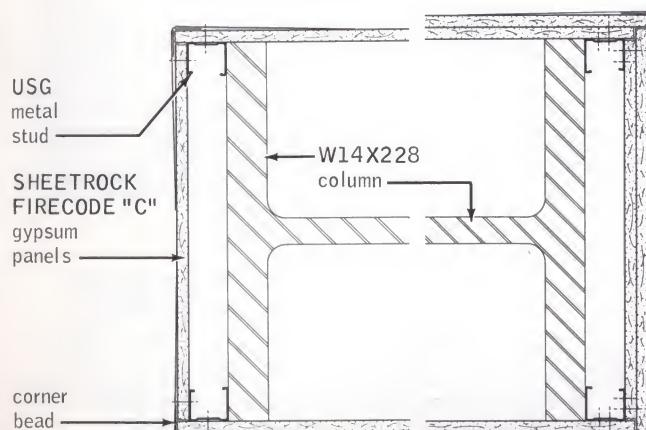
These systems are easily and quickly installed without waiting for adhesives to dry. In two 4-hour assemblies, the gypsum panel face layer is screw-attached to metal straps applied over a base of 2" solid or 3" hollow PYROBAR Gypsum Partition Tile. To obtain the 3-hour fire rating the gypsum panel layers are screw-attached to metal studs at column corners. DUR-A-BEAD Corner Reinforcement concealed with a U.S.G. joint compound resists damage from impact at exterior corners.

In these assemblies, a hard and abrasion-resistant surface may be obtained with a thin veneer ($\frac{1}{16}$ " to $\frac{3}{32}$ " thick) of specially formulated, high-strength gypsum plaster. IMPERIAL Plaster is applied over IMPERIAL FIRECODE "C" Plaster Base in lieu of SHEETROCK Panels. (See System Folder SA-912 for other IMPERIAL Plaster Systems.)

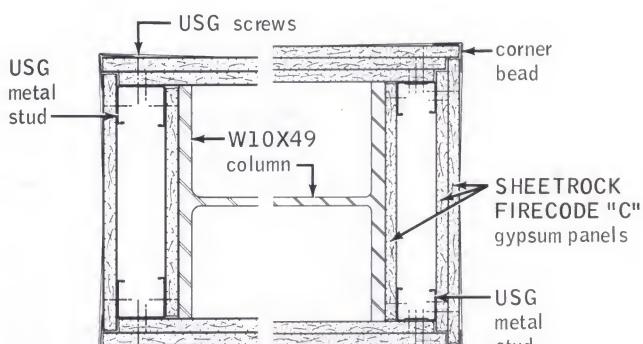


4-hr. X502 3-hr. X514

UL Designs



2-hr. X521 4-hr. X507
UL Designs



2-hr. X518 3-hr. X515
UL Designs

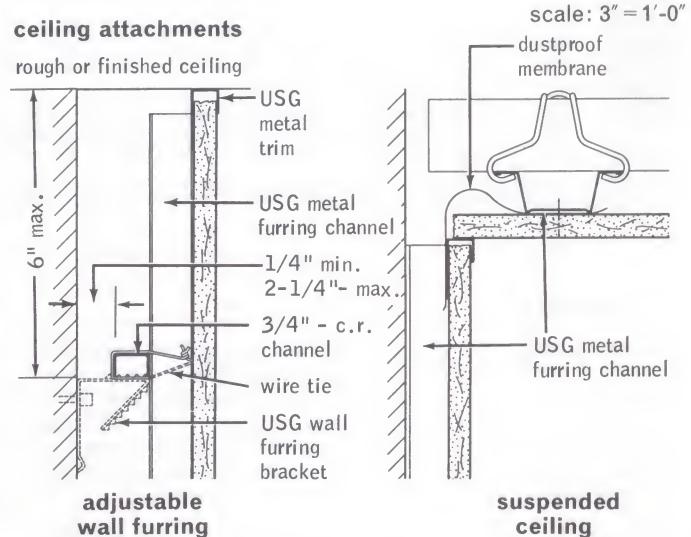
exterior wall furring/metal channels

description	comments
USG Metal Furring Channels, 24" o.c., $\frac{1}{2}$ " Foil-Back SHEETROCK screw-attached, joints finished	Direct attachment by means of furring strips does not isolate surface membrane from structural stresses. No limiting height
1" THERMAFIBER Z-Furring Insulation—USG Z-Furring Channels appl vert 24" o.c.— $\frac{1}{2}$ " SHEETROCK gypsum panels screw-attached to channels—joints finished	Noncombustible system with mineral fiber insulation

with USG Metal Furring Channels

Exterior masonry walls of virtually any type—brick, tile, PYROBAR Gypsum Tile, monolithic concrete—are readily furred with SHEETROCK SW Gypsum Panels screw-attached to USG Metal Furring Channels. Channels are either fastened directly to the masonry or furred using USG Adjustable Wall Furring Brackets and horizontal $\frac{3}{4}$ " channels. The latter construction provides up to 3" additional space for pipes, conduits or ducts. SHEETROCK for this assembly is available $\frac{1}{2}$ " and $\frac{5}{8}$ " thick and in either regular or foil-back types. With Foil-Back SHEETROCK Panels, the system provides significant insulating value (see table) and is effective as a vapor barrier. Meets ASTM requirements for vapor permeability not exceeding 0.30 perms.

SHEETROCK SW Gypsum Panels also provide an easily decorated facing when directly applied to interior masonry walls. See Gypsum Panels Product Folder SA-927 in this series for application methods and specifications.

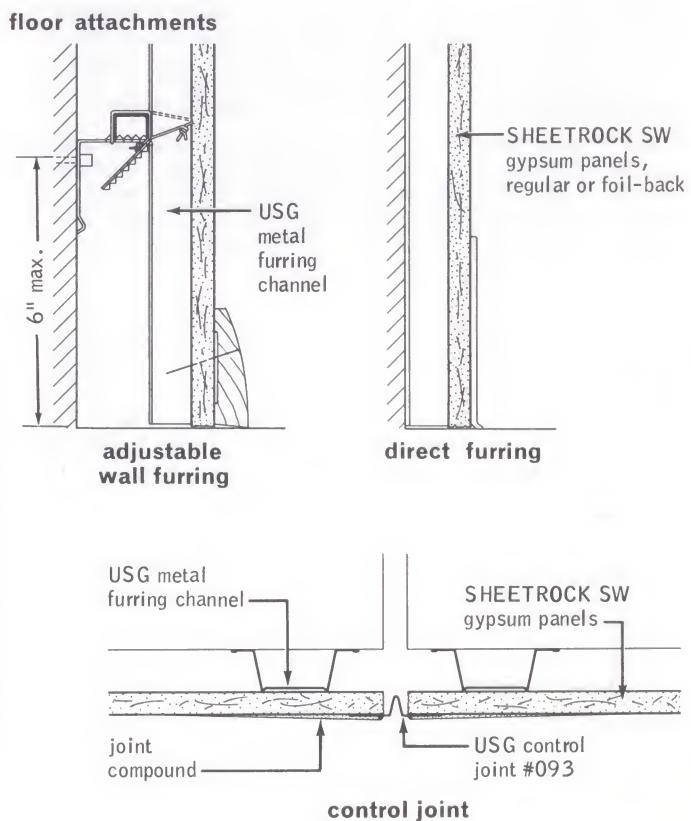
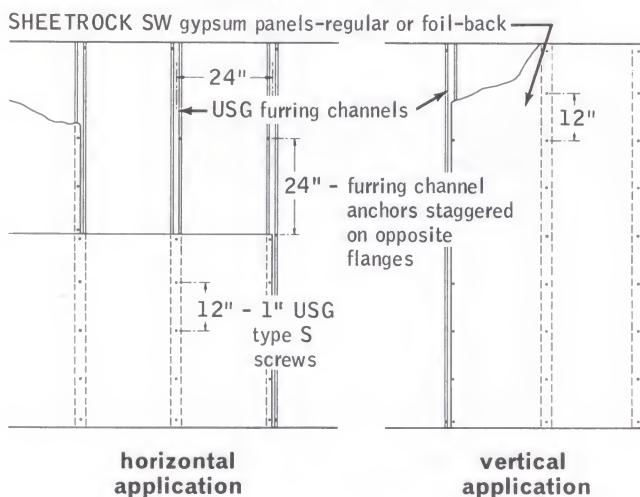


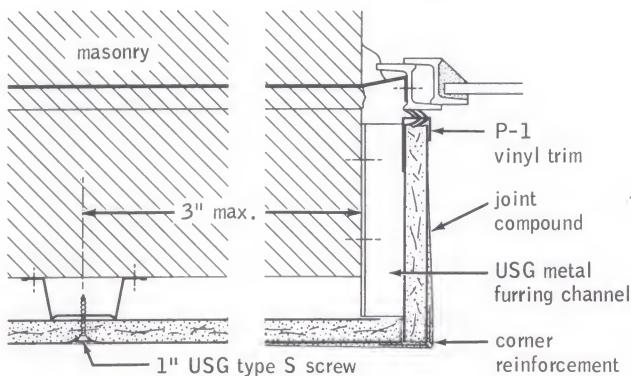
thermal resistance (R) values Foil-Back SHEETROCK panels (1)

$\frac{1}{2}$ " thickness	3.93
$\frac{5}{8}$ " thickness	4.04

(1) Resistances are based on vertical application, inside still air film, panel thickness with one reflective surface facing a $\frac{1}{4}$ " min. still air space.

wall elevation—scale: $\frac{1}{4}$ " = 1'-0"



furred wall plan sections**metal window—jamb****with USG Z-Furring Channels**

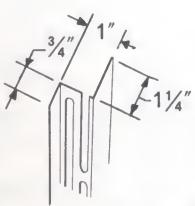
In this assembly, USG Z-Furring Channels, spaced 24" o.c., are used to mechanically attach THERMAFIBER Z-Furring Blankets to exterior walls. The insulation panels are applied progressively as the Z-Furring Channels are attached to the wall. Gypsum panels are screw-attached to the channel flanges to provide a drywall surface isolated to a great degree from the masonry wall. In new construction and in remodeling, this system provides a highly insulative self-furring solid backup for SHEETROCK Gypsum Panels.

USG Z-Furring Channels, suitable for $\frac{3}{4}$ " or 1" thick insulation, are formed from hot-dipped galvanized steel for added corrosion resistance. Fire-resistant THERMAFIBER Z-Furring Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid spun mineral fiber mat, 1" thick, that meet the requirements for Class A construction. Thermal insulation values (U-factors) for various assemblies are shown below.

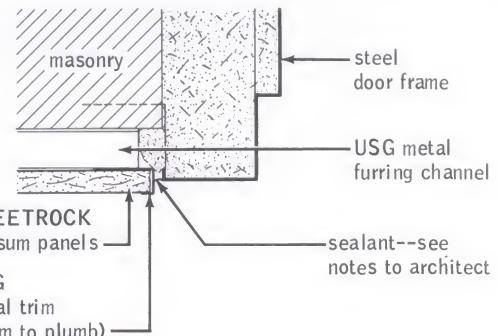
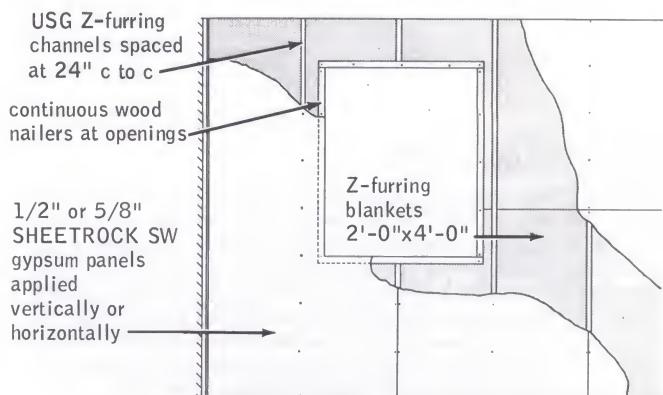
design heat transmission coefficients (U-factors)

wall construction	nom. wall thickn.	unfin. wall	furred wall (no insul.)	wall insulated with 1" THERMAFIBER Z-Furring Blankets
4" face brick				
8" block	12"	.42	.26	.14
4" face brick				
4" com. brick	8"	.48	.30	.15
SCR brick	6"	.67	.35	.14
poored conc. 140 lb./cu. ft.	8"	.70	.37	.14
conc. block sand & gravel aggregate	8"	.55	.33	.14
	12"	.49	.31	.13

†Interior wall finish: $\frac{1}{2}$ " SHEETROCK Gypsum Panels. All U-factors expressed in BTU/sq. ft./hr./°F, 75°F mean insulating temperature.

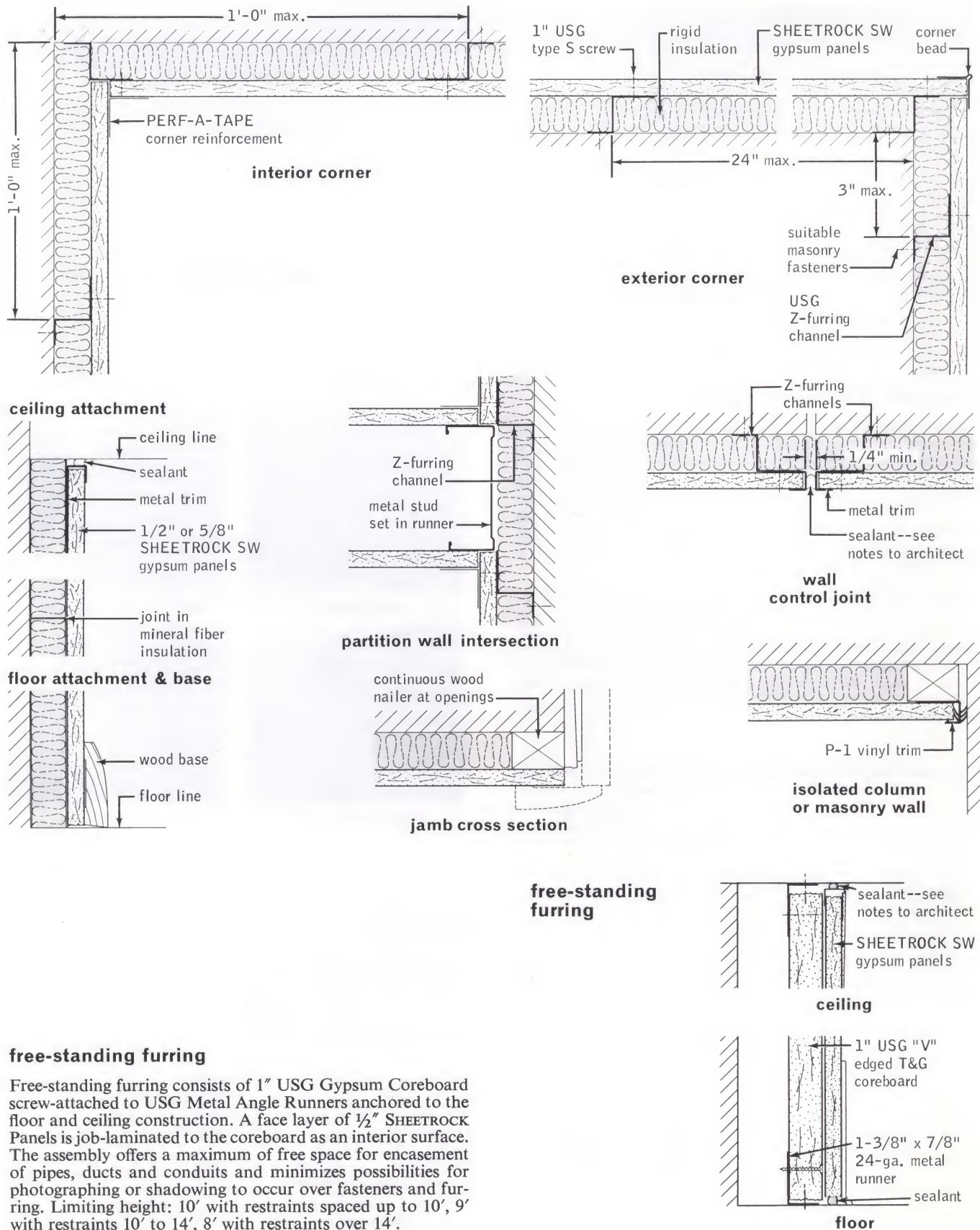
**USG Z-furring channel**

see "gypsum panels" product catalog for full description on accessories & sizes

**jamb—steel door frame****wall elevation**

exterior wall furring/Z-furring channels

scale: 3" = 1'-0"



free-standing furring

Free-standing furring consists of 1" USG Gypsum Coreboard screw-attached to USG Metal Angle Runners anchored to the floor and ceiling construction. A face layer of 1/2" SHEETROCK Panels is job-laminated to the coreboard as an interior surface. The assembly offers a maximum of free space for encasement of pipes, ducts and conduits and minimizes possibilities for photographing or shadowing to occur over fasteners and furring. Limiting height: 10' with restraints spaced up to 10', 9' with restraints 10' to 14', 8' with restraints over 14'.

ceilings/test data

USG Metal-Framed Drywall

fire rating	description	test no.	sound rating STC IIC	comments
N/A	5/8" SHEETROCK FIRECODE gypsum panels—1½" cr chan 4" o.c.—USG met fur chan 24" o.c.—panels screw att 12" o.c.—joints fin clg wt 3	USG-5-FT-G&H	(s) 45	"Up and over" attenuation—suspension and ceiling membrane only
2 hrs. (beam 2 hrs.)	½" SHEETROCK FIRECODE "C" gypsum panels—furred or susp—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—2½" conc on riblath or corrug stl deck over bar joist clg wt 3	UL Des G515 (was 221-2 hr) USG-189-FT-G&H (s)	(f) 54	STC based on furred interrupted ceiling, 1½" sound attenuation blankets extending 4' beyond partition
2 hrs.	5/8" SHEETROCK FIRECODE "C" gypsum panels—2" USG gypsum fir plank welded to bar joists 48" o.c.—skim-coat MASTICAL underlayment or DURABOND 90 compd over plank joints—(1) ½" vinyl fir tile (2) 66-oz carpet & 40-oz pad—USG met fur chan 24" o.c. wire-tied to joists—panels screw-att 12" o.c.—joints fin subflr wt 13.0	UL Des G516 (was 266-2 hr) (1) BBN-720317 (1) BBN-720316 (2) BBN-720314	(f) (s) 51 (s) 32 (s) 61	
2 hrs. and 3 hrs.	5/8" SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c. in field and 8" o.c. at ends—joints fin—pre-stressed conc units with 6" deep stems 48" o.c. clg wt 3	UL Des J502 UL Des J503 UL Des J504	(f) (f) (f)	2-hour rating based on 2" thick concrete slab; 3-hour rating based on 2¾" regular or 2½" lightweight concrete slab
3 hrs. (beam 3 hrs.)	5/8" SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—3" conc on riblath over bar joist	UL Des G512 (was 82-3 hr)	(f) N/A	

beam applications

2 hrs. (beam only)	Gypsum Drywall Caged Beam Fireprfg—1½" USG stl run chan brackets 24" o.c.—1¾" x ½" corner angles att to chan brackets—dbl layer ½" SHEETROCK FIRECODE gypsum panels att with Type S screws—met beads on corners—joints fin—2½" conc deck on fluted stl fir	UL Des N501 (was 254-2 hr) UL Des N502 (was 255-2 hr)	(f) (f)	Design N502 based on 1½" steel runner for corner angles and coped brackets
3 hrs. (beam only)	Gypsum Drywall Caged Beam Fireprfg—1½" USG stl run chan brackets 24" o.c.—1¾" x ½" corner angles att to brackets—3 layers ½" SHEETROCK FIRECODE gypsum panels att with Type S screws—1" 20-ga hex mesh on bottom over middle layer—met beads on corners—joints fin—2½" conc deck on fluted stl fir	UL Des N505 (was 214-3 hr)	(f)	Extends drywall use to beam protection. Fire rating for restrained assembly; 2-hour rating for unrestrained assembly

description

These fire-rated ceiling assemblies consist of SHEETROCK FIRECODE Gypsum Panels screw-attached to USG Metal Furring Channels. The galvanized steel channels are clipped or wire-tied to suspended main runner channels or wire-tied to main support members. For long span requirements resulting from location of large ducts or pipes in the ceiling space, the USG Steel Stud may be used as a ceiling furring member or in a separate framing system (see table below).

The USG Steel Stud Framing System is ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above; accommodates light troffers, ducting and electrical services. Gypsum panels for these assemblies are available in ½" and 5/8" thicknesses and in five types (see Specifications, page 17). Foil-Back SHEETROCK Panels offer an effective vapor barrier and increase the overall "U" factor of the roof-ceiling assembly (see table at right). Regular SHEETROCK provides a firm base for acoustical tile adhesively applied. USG Exterior Gypsum Ceiling Board is suitable for exterior ceilings and soffits with indirect exposure to the weather.

function and utility

These noncombustible assemblies are designed for furred or suspended ceilings or caged beam fireproofing. They serve to conceal and protect structural and mechanical elements with gypsum panel base for tile or other finish.

limitation

USG Steel Studs are not designed to carry live loads, mechanical equipment or material storage (see load table below and details, page 15). Maximum USG Metal Furring Channel spacing limited to 24" o.c. with main support members 48" o.c. and hangers 48" o.c. For UL Design G515, maximum spacing for main support members is 24" o.c.

thermal resistance (R) values
Foil-Back SHEETROCK panels (1)

thickness	½"	5/8"
summer conditions	4.92	5.03
winter conditions	2.73	2.84

(1) Resistances are based on horizontal application, inside still air film, panel thickness and one reflective surface facing a ¼" min. still air space.

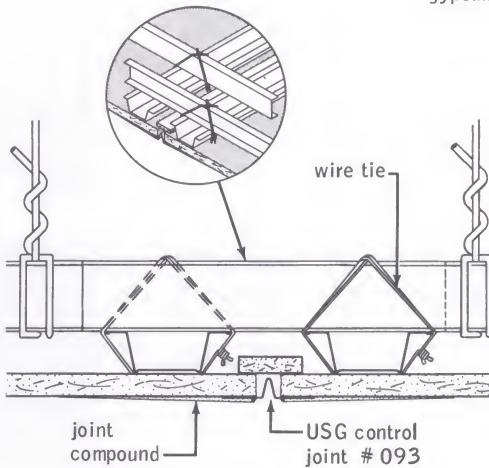
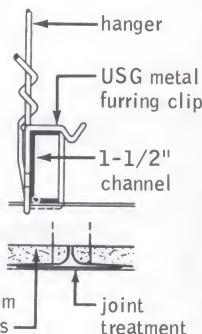
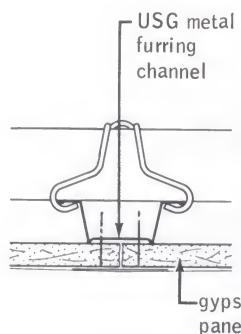
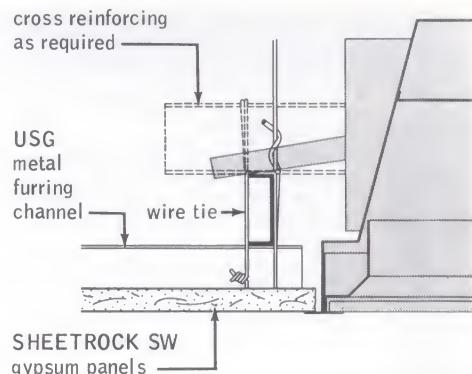
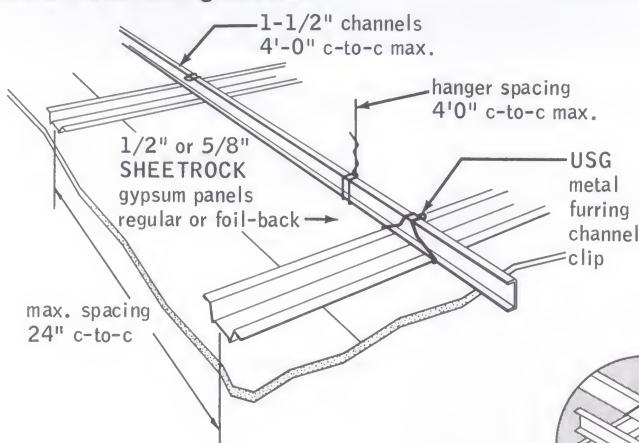
limiting span—USG Steel Stud Ceiling System

stud type & width	USG Standard Steel Studs						USG 20-ga. Steel Studs								40ST10		60ST10					
	212ST5			358ST5			40ST5			212ST10			358ST10			40ST10		60ST10				
stud spacing-in.	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	
single span	5	11'0"	10'3"	9'0"	14'6"	13'6"	11'9"	15'3"	14'3"	12'6"	13'0"	12'0"	10'6"	17'3"	16'0"	14'0"	18'6"	17'0"	15'0"	23'6"	21'9"	19'0"
uniform load —psf	10	8'9"	8'3"	6'0"	11'6"	10'9"	8'9"	12'3"	11'3"	9'3"	10'6"	9'6"	8'6"	13'9"	12'6"	11'0"	14'9"	13'6"	11'9"	18'9"	17'3"	15'0"
	15	7'9"	6'9"	5'6"	10'0"	8'9"	7'3"	10'9"	9'3"	7'9"	9'0"	8'6"	7'3"	12'0"	11'0"	9'9"	13'0"	11'9"	10'3"	16'3"	15'0"	13'0"
	20	6'9"	5'9"		8'9"	7'6"	6'3"	9'3"	8'0"	6'6"	8'3"	7'6"	6'9"	11'0"	10'0"	8'9"	11'9"	10'9"	9'6"	14'9"	13'9"	12'0"
double and triple span	5	11'3"	10'6"	9'3"	14'9"	13'9"	12'0"	15'9"	14'6"	12'9"	13'3"	12'3"	10'9"	17'6"	16'0"	14'0"	18'9"	17'3"	15'3"	23'9"	22'0"	19'3"
uniform load —psf	10	9'0"	8'3"	7'3"	11'9"	10'9"	9'6"	12'6"	11'6"	10'0"	10'6"	9'9"	8'6"	13'9"	12'9"	11'3"	15'0"	13'9"	12'0"	19'0"	17'6"	15'3"
	15	7'9"	7'3"	6'3"	10'3"	9'6"	7'6"	10'9"	10'0"	7'6"	9'3"	8'6"	7'6"	12'0"	11'3"	9'9"	13'0"	12'0"	10'6"	16'6"	15'3"	13'3"
	20	7'0"	6'6"	5'3"	9'3"	8'6"	5'6"	9'9"	8'6"	5'6"	8'3"	7'9"	6'9"	11'0"	10'3"	8'9"	11'9"	11'0"	9'6"	15'0"	13'9"	12'0"

details

scale: 3" = 1'-0"

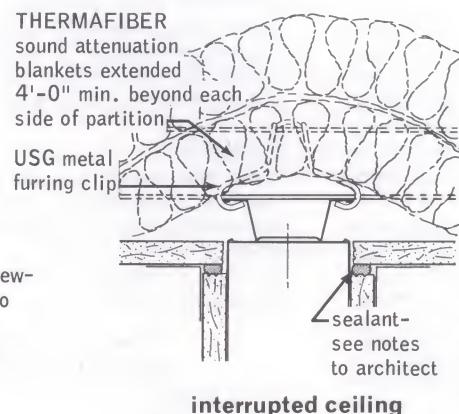
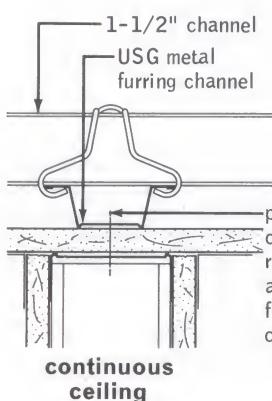
USG metal furring channel



grillage suspension

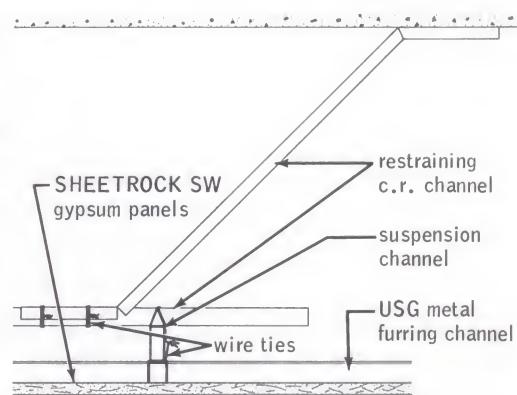
control joint

wall intersection

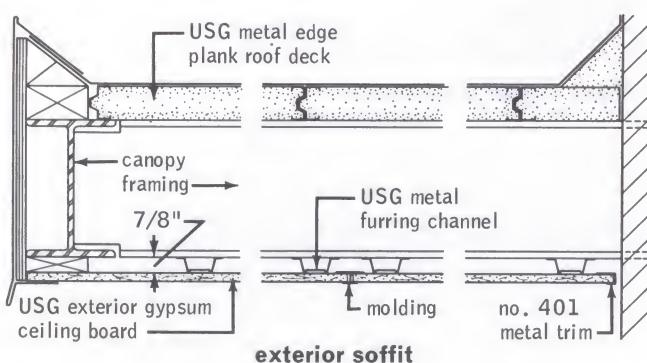


continuous ceiling

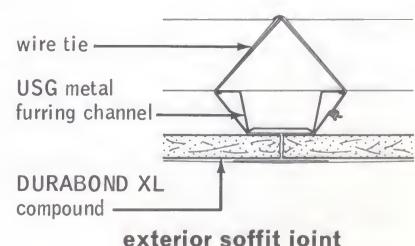
interrupted ceiling



optional bracing
for lateral ceiling loads

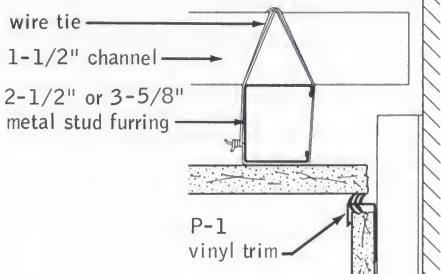
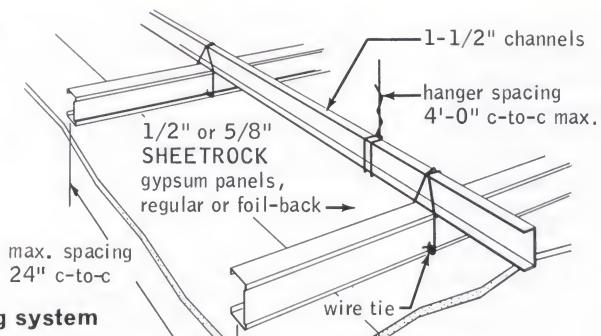
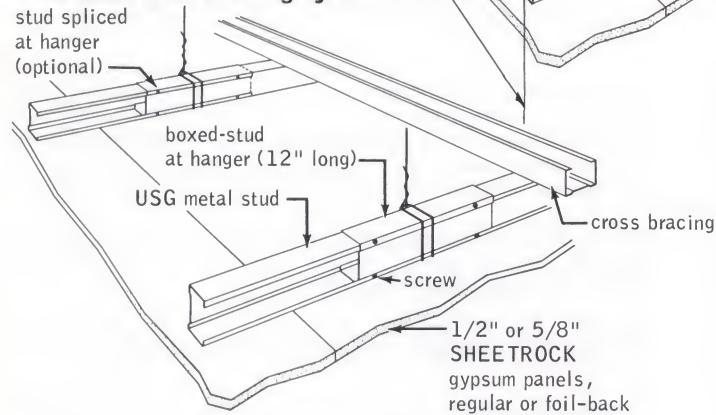
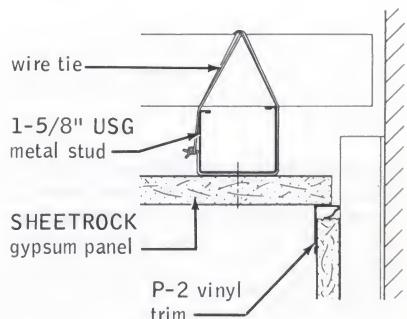
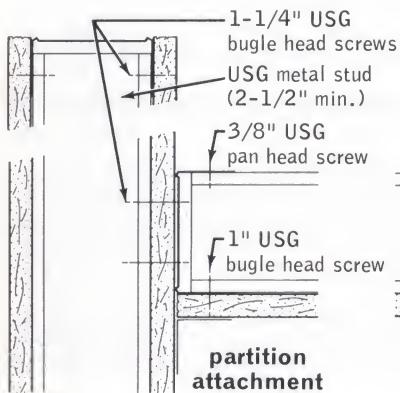
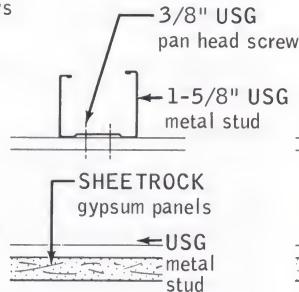
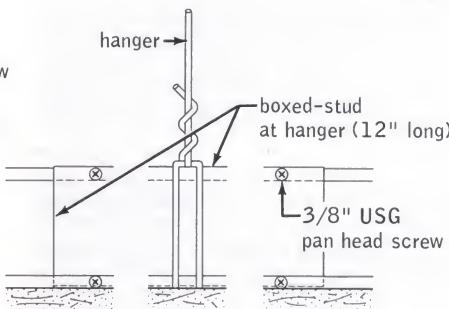


exterior soffit

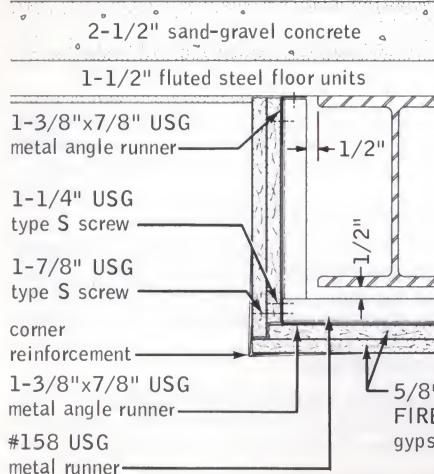
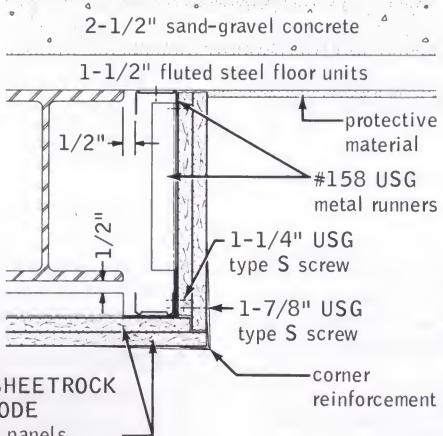


details

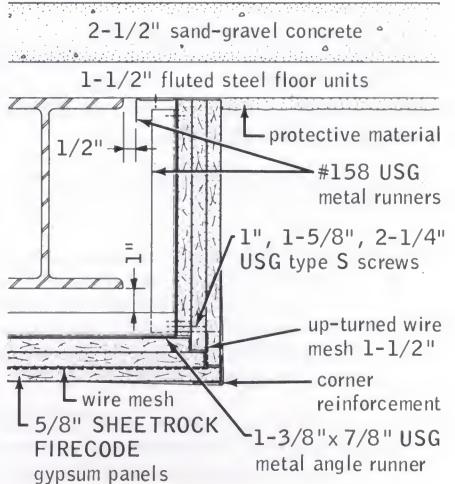
scale: 3" = 1'-0"

USG Metal-Framed Drywall**USG metal stud furring****USG metal stud framing system****wall intersection****wall intersection (optional)****partition attachment****cross bracing****hanger attachment****beam protection (beam only)**

2-hr. UL design no. N501

**2-hr. UL design no. N502****3-hr. UL design no. N505 (restrained)**

2-hr. UL design no. N505 (unrestrained)



specifications

notes to architect

1. Gypsum panel surfaces should be isolated with control joints or other means where: (a) partition, furring or column fire-proofing abuts a structural element (except floor) or dissimilar wall or ceiling; (b) ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimensions exceed 50' in either direction; (f) the area within separate ceiling sections exceeds 2,500 sq. ft.; (g) wings of "L", "U" and "T"-shaped ceiling areas are joined; (h) expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.
2. Penetrations of the gypsum panel diaphragm, such as door frames, borrowed-light openings, vents, grilles, access panels and light troffers, require additional reinforcement at the corners to distribute concentrated stresses if a control joint is not used.
3. Metal door and borrowed-light frames should be at least 18-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 6). Stud reinforcing described below is screw-attached to jamb anchor clips. Three-piece frames may also be used with these partitions.
- For hollow-core doors up to 2'8" wide, standard steel studs may be used for reinforcing. For solid-core doors and hollow-core doors 2'8" to 4'0" wide, reinforcing should be 20-ga. steel studs. For doors over 4'0" wide, double doors and extra heavy doors such as used for X-ray rooms, two 20-ga. studs placed back-to-back should be used.
- For added door frame restraint, spot-grouting at the jamb anchor clip is recommended. Spot-grouting is required for solid-core doors and doors over 2'8" wide. Apply DURABOND or USG Ready-To-Use Joint Compound just before inserting board into frame; do not terminate gypsum panel against trim return.
4. Additional chases can be provided in metal studs (except in fire-rated construction) by cutting round holes up to $\frac{3}{4}$ of stud width, spaced 12" apart.
5. Ceramic Tile—SHEETROCK W/R Gypsum Panels are recommended as a base on walls for adhesive application of ceramic, metal and plastic tile.
6. Fixture Attachment—Lightweight fixtures and trim should be installed using plastic plugs or expandable anchors for screw attachment. Wood or metal mounting strips for cabinets and shelving should be attached with toggle bolts through the gypsum panels near studs (see details, page 8).
7. Wood base should be applied with trim head screws placed at each stud and midway between studs (12" o.c.).
8. Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Door and borrowed-light openings are not recommended in sound control partitions.
9. For adhesive applications of TEXTONE Gypsum Panels, only DURABOND Adhesives are recommended; other adhesives may not be compatible with the vinyl surface.
10. In ceilings, spacing of hangers and channels is designed to support only the dead load. Heavy concentrated loads should be independently supported.
11. Plenum or attic space closed by ceiling installation should be vented with a min. $\frac{1}{2}$ -sq. in. net free vent area per sq. ft. of horizontal surface.
12. To comply with UL Floor-Ceiling Designs G512 and G515, gypsum panel end joints should be aligned and backed by 2" wide face panel strips laid over the joints. Face panels should be fastened to continuous furring channels centered 2" either side of joints. For UL Designs J502, J503, and J504, end joints should be backed by 3" wide strips and furring channels centered $3\frac{1}{4}$ " either side of joints.
13. Back-blocking of ceiling end joints is recommended when construction occurs during adverse job or weather conditions. Float end joints between furring channels and back-block joint with a continuous 8" face panel strip adhesively applied, or screw-attach floated ends to a 5-ft. channel centered over joint.
14. Treatment of joints and screw heads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.
15. All exposed surfaces of USG Exterior Gypsum Ceiling Board should receive two coats of USG exterior paint.
16. During periods of low outside temperature, condensation may form on exterior walls, collecting airborne dirt to produce photographing or shadowing over fasteners and furring. This natural phenomenon occurs through no fault of the products.
17. Shallow electrical outlet boxes are recommended when insulation less than $1\frac{1}{2}$ " thick is used in furring systems.
18. See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-927 for information on system components; Paint Products Folder SA-933 for paint specifications; Plaster Bases & Accessories Folder SA-917 for information on PYROBAR Partition Tile.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. USG Steel Studs

—Standard: 158ST5 (1½"), 20ST5 (2"), 212ST5 (2½"), 30ST5 (3"), 358ST5 (3½"), 40ST5 (4"), 60ST5 (6").
—20-ga.: 20ST10 (2"), 212ST10 (2½"), 30ST10 (3"), 40ST10 (4"), 60ST10 (6").

b. USG Steel Runner

—Standard: 158CR5 (1½"), 20CR5 (2"), 212CR5 (2½"), 30CR5 (3"), 358CR5 (3½"), 40CR5 (4"), 60CR5 (6").
—20-ga.: 20CR10 (2"), 212CR10 (2½"), 30CR10 (3"), 358CR10 (3½"), 40CR10 (4"), 60CR10 (6").

c. USG Metal Furring Channel.

d. USG Metal Furring Channel Clip.

e. USG Z-Furring Channel.

f. Cold-Rolled Channels (¾") (1½").

g. 8-ga. Galvanized Hanger Wire.

h. Galvanized Tie Wire (16) (18)-ga.

i. USG Adjustable Wall Furring Bracket.

j. Faceboards—(½") (⅝") thick, 48" wide SHEETROCK (SW) (Regular) (Foil-Back) (FIRECODE) (FIRECODE "C") (SHEETROCK W/R FIRECODE "C") (TEXTONE) Gypsum Panels, USG Exterior Gypsum Ceiling Board, lengths as required.

k. Backing Board—½" USG Mineral Fiber Sound Deadening Board; ¼" SHEETROCK Gypsum Panels.

l. Insulation

—THERMAFIBER Sound Attenuation Blankets (1") (1½") (2") x 24" x 48".

—THERMAFIBER Z-Furring Blankets, 1"x24"x48".

m. Adhesive

—DURABOND Joint Compound-Taping or 90 (for double-layer application and column fireproofing).

—DURABOND 200 (for single-layer application).

—DURABOND (500) (200) (for furring application).

n. Fasteners—USG Brand Screws: ¾" Type S, pan head; ¾" Type S, hex washer head; ¾", ½" Type S-12, pan head; ¾", 1", 1½", 1½", 1¾", 1¾", 2¼" Type S, bugle head; 1¾", 2¼" Type S, trim head; 1½" Type G, bugle head; 1¼" Type W, bugle head; 1¼" GWB-54 annular ring nail.

o. USG Trim No. (200-A) (200-C) (401) (402) (P-1).

- p. USG Corner Bead—(No. 103 DUR-A-BEAD) (No. 104 DUR-A-BEAD) (No. 900) Metal Corner Reinforcement.
- q. USG Control Joint No. 093.
- r. Joint Treatment—(select a U.S.G. Joint System).
- s. Caulking—USG Acoustical Sealant.
- t. PYROBAR Gypsum Partition Tile (2" Solid) (3" Hollow).
- u. RED TOP Partition Tile Cement.
- v. Clean, sharp sand complying with ASTM C35 (not available from U.S.G.).
- w. USG 1¾" x 7/8" x 24-ga. Galvanized Metal Angles.
- x. 2" x 26-ga. galv. steel straps (not available from U.S.G.).

Part 3: execution

3.1 partition installation

3.1.1 stud system erection

Attach metal runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle or molly bolts spaced 16" o.c.

Position studs vertically, engaging floor and ceiling runners, and spaced 24" o.c. When necessary, splice studs with 8" nested lap and one positive attachment per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against exterior walls and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs for shelf-walls and those adjacent to door and window frames, partition intersections, and corners to ceiling and floor runner flanges with USG Metal Lock Fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bend at each end, and secure with one positive attachment per flange. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.

3.2.1 gypsum panel erection

Apply gypsum panels (vertically) (horizontally). Position all edges over studs for vertical application; all ends over studs

screw locations and spacing—fire-rated metal stud drywall partitions

test number	face layer application				base layer application			
	USG brand screw		spacing and location	USG brand screw	spacing and location		spacing and location	spacing and location
	length	type			length	type		
U of C 6/15/65	1¾"	S	12" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S	12" o.c. to studs at joints and in field, 12" o.c. to runners		
UL Des U411-2 hr.	1½"	G	adhesive lamination and supplementary screws	1"	S	8" o.c. to studs at joints, 12" o.c. to studs in field		
UL Des U411-2 hr.	1¾"	S	16" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S	16" o.c. to studs at joints and in field		
UL Des U412-2 hr.	1½"	G	adhesive strip lamination and supplementary screws	1"	S	12" o.c. to studs at joints and in field		
UL Des U412 U of C 9/21/64	1¾"	S	12" o.c. to studs at joints and in field	1"	S	12" o.c. to studs at joints and in field		
T-3362 OSU	1"	S	12" o.c. to studs at joints and runners, 8" o.c. to studs in field					
T-1174 OSU U of C 7/31/62 GA-WP-45 1 hr.	1"	S	8" o.c. to studs at joints, 12" o.c. to studs in field					

for horizontal application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

Screw spacing shown below is for non-rated construction. For fire-rated construction, obtain screw spacing from table, page 17.

For single-layer vertical application of gypsum panels, space screws 12" o.c. in field of panels and 8" o.c. staggered along vertical abutting edges. For horizontal panel application, space screws 12" o.c. in field and along abutting end joints.

For single-layer adhesive application, pre-bow panels and attach vertically to studs using $\frac{3}{8}$ " continuous adhesive beads applied to face of studs. Apply one bead to intermediate studs and two beads to studs occurring at panel joints. Secure panel at top and bottom with 1" type S screws spaced 16" o.c. Impact panel along each stud to insure good contact at all points.

For double-layer screw attachment, space screws 16" o.c. for both layers. Apply both layers of gypsum panels vertically with joints in face layer offset from base layer joints. For $\frac{5}{8}$ " panels, use 1" screws for base layer and $1\frac{5}{8}$ " screws for face layer. For $\frac{1}{2}$ " panels, use $\frac{7}{8}$ " screws for base layer and $1\frac{5}{16}$ " screws for face layer.

For double-layer laminated construction, attach base layer with 1" type S screws spaced 8" o.c. at joint edges and 12" o.c. in field. Apply face layer vertically with DURABOND Joint Compound-Taping spread on back side, joints staggered approx. 12" and fastened to base layer with $1\frac{1}{2}$ " type G screws. Drive screws approx. 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 2" from vertical edges. Temporary shoring or support installed 16" to 24" o.c. until adhesive is dry may be used in place of screws.

3.1.3 mineral fiber sound deadening board erection

For two-layer construction with mineral fiber sound deadening board, apply base layer sound deadening board vertically with joints staggered on opposite sides of partition. Attach board to metal studs with 1" type S screws spaced 27" o.c. along vertical joints and at quarter and mid-points of panel height along intermediate stud. Place two screws at each end of board through runner 1" from each vertical edge. Apply face layer vertically with joints staggered from base layer joints and laminate to base layer using DURABOND Joint Compound-Taping. Fasten face panels around perimeter with $1\frac{5}{8}$ " type S screws spaced 12" o.c.

3.2 chase wall erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub nails or power-driven anchors 24" o.c., to suspended ceilings with toggle or molly bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position metal studs vertically in runners, 24" o.c., with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs to floor and ceiling runner flanges with USG Metal Lock Fastener tool.

Cut cross bracing to be placed between rows of studs from gypsum panels, 12" high by chase wall width. Space braces 48" o.c. vertically and attach to stud webs with six 1" type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side.

Bracing of $2\frac{1}{2}$ " metal studs may be used in place of gypsum panels. Anchor web at each end of metal brace to stud web with two $\frac{3}{8}$ " pan head screws. When chase wall studs are not opposite, install metal stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal $2\frac{1}{2}$ " runner screw-attached to chase wall studs within the cavity.

3.3 drywall soffit erection

Attach metal runners 24" o.c. to concrete slabs with concrete stub nails or power-driven anchors, to suspended ceilings with toggle bolts or molly bolts or to wood framing with suitable fasteners. On stud walls, space fasteners to engage each stud. On ceilings, place fastener close to outside face runner. Fasten vertical face panel to web of face corner runner and flange of ceiling runner with 1" type S screws spaced 12" o.c. For braced furring, insert metal studs between face corner runner and sidewall runner and attach alternate studs to runners with USG Metal Lock Fastener tool. Attach bottom face panel to metal studs and runners with 1" type S screws spaced 12" o.c. Space screws in face corner runner at least 1" from edge of gypsum panel.

3.4 ceiling installation

3.4.1 grillage erection

Space 8-ga. hanger wires 48" o.c. along carrying channels and within 6" of ends of carrying-channel runs. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install $1\frac{1}{2}$ " carrying channels (48") (24" for fire-rated construction) o.c., and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 16-ga. tie wire.

Erect metal furring channels at right angles to $1\frac{1}{2}$ " carrying channels or main support members. Space furring (16") (24") o.c. and within 6" of walls. Provide 1" clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double-strand 16-ga. tie wire. At splices, nest furring channels at least 8" and securely wire-tie each end with double-strand 16-ga. tie wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.4.2. metal stud framing system erection

Attach runners at ceiling height, through gypsum panels, to each partition stud with two screws. Insert metal studs in runners and attach each end with one $\frac{3}{8}$ " pan head screw. Install $1\frac{5}{8}$ " stud cross-bracing over stud framing, space 48" o.c. and attach to each framing stud with two $\frac{3}{8}$ " pan head screws. At hangers, install 12" long stud section for box reinforcing or lap studs 12" and secure each end with two $\frac{3}{8}$ " pan head screws.

At light troffers or any openings that interrupt the ceiling, install additional cross reinforcing to maintain structural integrity of framing.

3.4.3 gypsum panel erection

Apply gypsum panels of maximum practical length with long dimension at right angles to furring channels. Position end joints over channel web and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" type S screws spaced 12" o.c. in field of panels and along abutting ends and edges.

3.5 caged beam fireproofing

Position ceiling runners at least $1\frac{1}{2}$ " from and parallel to beam and fasten to floor units with $\frac{1}{2}$ " type S-12 pan head screws spaced 12" o.c. Fabricate hanger brackets from $1\frac{5}{8}$ " metal runners allowing ($\frac{1}{2}$ ") (1") clearance at bottom of beam. Space brackets 24" o.c. along beam and attach to ceiling

runners with $\frac{1}{2}$ " type S-12 screws. Install lower corner runners parallel to beam and fasten to brackets with $\frac{1}{2}$ " type S-12 screws.

Screw-attach (two) (three) layers of $\frac{5}{8}$ " SHEETROCK FIRECODE Gypsum Panels to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in each layer. Attach panels to channel brackets with (1") (1 $\frac{1}{4}$) type S screws 16" o.c. for base layer, 1 $\frac{5}{8}$ " type S screws 12" o.c. for middle layer and (1 $\frac{7}{8}$) (2 $\frac{1}{4}$) type S screws 8" o.c. for face layer. For 3-hour assembly, install wire mesh over bottom middle layer panel, extend 1 $\frac{1}{2}$ " up each side and fasten with 1 $\frac{5}{8}$ " screws used to fasten panels.

3.6 column fireproofing installation

3.6.1 UL Design X518-2 hrs.

Attach inner layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels to 1 $\frac{5}{8}$ " metal studs with 1" type S screws spaced 24" o.c. and place assembly with gypsum panel next to column flange. Install gypsum panel layer vertically around column using 1" type S screws to attach base layer to stud web 24" o.c. and face layer to stud flange 12" o.c. Apply face layer vertically over web face side of column and fasten through base layer to web of studs with 1 $\frac{5}{16}$ " type S screws spaced 12" o.c. and staggered from screws in base layer. Apply corner bead at all corners, fasten with 1" type S screws 12" o.c. and finish with joint compound.

3.6.2 UL Designs X521-2 hrs. & X514-3 hrs.

For all W14 x 228 steel columns, provide fire protection with $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels applied vertically over 1 $\frac{5}{8}$ " metal studs positioned at corners. Attach panels to studs with 1" type S screws spaced 12" o.c. For 3-hour rating install additional layer over web surface and attach to studs with 1 $\frac{5}{8}$ " type S screws spaced 12" o.c. Apply corner bead at all corners and finish with joint compound.

3.6.3 UL Design X515-3 hrs.

Attach inner layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels to 1 $\frac{5}{8}$ " metal studs with 1" type S screws spaced 12" o.c. and place assembly with gypsum panel next to column flange. Install two additional layers to stud flange and three additional layers to stud web over web face side of column. Fasten base layers with 1" type S screws, middle layers with 1 $\frac{5}{8}$ " screws and face layers with 2 $\frac{1}{4}$ " screws. Space all screws 12" o.c. vertically. Apply corner bead at corners; finish with joint compound.

3.6.4 UL Design X507-4 hrs.

For all W14 x 228 steel columns, provide fire protection with double-layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels applied vertically over 1 $\frac{5}{8}$ " metal studs positioned at corners. Attach base layer to studs with 1" type S screws spaced 12" o.c. and attach face layer with 1 $\frac{5}{8}$ " type S screws spaced 12" o.c. and staggered 6" from base layer screws. Apply corner bead at all corners and finish with joint compound.

3.6.5 UL Designs X502-4 hrs. & X504-4 hrs.

a. **Mortar**—Mix mortar in proportion of 1 part Partition Tile Cement to 3 parts sand, by weight. Mortar shall not be retempered.

b. **Gypsum Tile**—Lay tile plumb and true around columns as shown on plans after rough plumbing and wiring are in place. Place tile with core holes horizontal in uniformly level courses on $\frac{1}{2}$ " thick mortar beds. Set tile to provide $\frac{1}{2}$ " minimum clearance from edges and faces of column. Stagger vertical joints; interlock tile at corners; cut all joints flush. Use no broken tile; fill chinks and crevices with mortar. Cut top tile obliquely and wedge in place at ceiling; slush joint full with

mortar. Seal exposed core holes with at least 2" of mortar. Do not cut or chase tile for conduit or other piping.

c. **Gypsum Panels**—Install 2"x26-ga. galvanized perimeter straps horizontally around tile no more than 24" from floor and ceiling and max. 48" o.c. Secure strap ends with $\frac{3}{8}$ " USG type S pan head screws. Place 1 $\frac{3}{8}$ "x $\frac{7}{8}$ "x24-ga. galvanized metal angles, cut to $\frac{1}{2}$ " less than floor-to-ceiling height, over perimeter straps at each corner. Secure corners to straps with $\frac{3}{8}$ " type S pan head screws driven in each angle flange. Install $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Gypsum Panels vertically and securely attach to corner angles with 1" type S screws spaced 8" o.c. Apply corner bead at all corners and finish with joint compound.

3.7 wall furring installation

3.7.1 direct furring channel attachment

Attach metal furring channels (vertically) (horizontally), spaced 24" o.c., to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24" o.c. on opposite flanges. Nest channels 8" at splices and anchor with two fasteners in each wing. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

3.7.2 bracketed furring channel attachment

Attach adjustable wall furring brackets with serrated edges up, 36" o.c. horizontally, 48" o.c. vertically, within 4" of columns or other abutting construction, within 6" of floor and ceiling, and as required above and below windows, with (2" cut nail in mortar joints of brick or clay tile or concrete block, or in field of lightweight aggregate blocks) ($\frac{5}{8}$ " concrete stub nails or power-driven nails or other suitable fasteners in monolithic concrete). Place fastener in top hole of bracket.

Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with double-strand 16-ga. or triple-strand 18-ga. wire; bend down excess bracket length. Erect metal furring channel vertically, spaced 24" o.c. and tie with double-strand 16-ga. or triple-strand 18-ga. wire at each junction with cold-rolled channel.

3.7.3 gypsum panel erection

Apply gypsum panels (vertically) (horizontally). Position all edges over furring channels in vertical application; all ends over framing in horizontal application with joints staggered in successive courses. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" type S screws spaced 12" o.c.

3.7.4 mechanical application—Z-furring channels

Erect mineral-fiber insulation vertically and hold in place with Z-furring channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner; start from this furring channel with a 3" strip of insulation followed by furring channel in the normal manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold insulation in place until gypsum panels are installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel.

Apply gypsum panels (vertically) (horizontally) with vertical joints occurring over channels. Attach gypsum panels to channels with 1" type S screws spaced 12" o.c.

3.8 accessory application

a. Joint System—Finish all face panel joints and internal angles with a U.S.G. Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. Laminating Adhesive—Spread to provide $\frac{1}{2}$ " adhesive beads $4\frac{1}{2}$ " o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips of four $\frac{1}{2}$ " beads $1\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c.

c. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with $\frac{9}{16}$ " rosin-coated

staples 9" o.c. on both flanges along entire length of bead.

d. Metal Trim—Where assembly terminates against masonry or other dissimilar material, apply metal trim over panel edge and fasten with screws or $\frac{9}{16}$ " rosin-coated staples 12" o.c.

e. P-1 Vinyl Trim—Slip trim over panel with long flange behind panel. Install panel with trim firmly abutting surface.

f. Screws—Power-drive at least $\frac{3}{8}$ " from edges or ends of panel to provide uniform dimple $1\frac{1}{32}$ " deep.

g. Control Joints—Break panel behind joint and back by double framing members (and 2" wide gypsum panel strip). Attach control joint to face layer with $\frac{9}{16}$ " rosin-coated staples spaced 6" o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, TEXTONE, PYROBAR, RED TOP, IMPERIAL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

lightweight, quickly-erected, fire-rated walls and ceilings with excellent sound attenuation

These basic gypsum drywall assemblies offer economical, quickly erected, load-bearing partitions and ceilings wherever fire protection is desired with wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications. Also designed for wood-frame construction are USG Area Separation walls, newly developed firewall assemblies for multi-family housing. Variations of the systems meeting special requirements are outlined below:

Single Layer—a basic drywall load-bearing construction suitable where SHEETROCK SW Gypsum Panels are applied direct to wood framing—either vertically, with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Horizontal application, recommended except in fire-rated partition construction or for predecorated panels, provides greater strength, reduces joint treatment and blocking needed, compensates for uneven framing alignment. Fastening of panels is by four alternate methods:

1. **Standard single nailing**—6" to 7" c. to c. spacing for ceilings, 7" to 8" for walls.
2. **Double nailing**—for minimizing defects due to loosely nailed panels. First nails spaced 12" o.c., followed by second nails within 2" of first.
3. **Screw application**—best known insurance against fastener pops caused by loosely attached panels. 1 1/4" USG Brand Type W Screw is used.
4. **Adhesive nail-on**—continuous bead of DURABOND 200 or 300 Adhesive applied to framing plus supplementary nailing; improves bond strength by 50% to 100%, greatly reduces face nailing needed. When DURABOND Vinyl Foam Tape is used, supplementary fasteners are unnecessary.

Two other proven methods upgrade job quality:

Back-Blocking Joint Reinforcement—a patented system designed to minimize an inherent joint deformation ("ridging") that may occur with adverse job and weather conditions.

Floating Interior Angle System—application of panels to effectively reduce nail pops and angle cracking which may result from stresses at intersections of walls and ceilings.

Double Layer—systems consist of a face layer of SHEETROCK Gypsum Panels job-laminated and/or nailed to base layer of gypsum panels and directly attached to wood framing in walls and ceilings. Because these laminated systems minimize the

use of mechanical fasteners in the face layer, finer appearance results—along with greater strength, fire and sound resistance. Adhesive lamination of face layer to base layer, when both are gypsum panels, is by either of two methods: (a) **strip lamination**—DURABOND Joint Compound-Taping or 90 applied in vertical strips 24" o.c. and supplementary 1 1/2" USG Brand Type G Screws, or (b) **sheet lamination**—adhesive applied over the entire panel surface with supplementary Type G screws or temporary supports until adhesive dries.

When a fire rating is not required, contact bonding of face layer with DURABOND Adhesive is preferred. Either DURABOND 500 (notched-spreader applied) or DURABOND 600 (roller-applied) is used with fasteners 16" o.c. at top and bottom of wall panels and perimeter fasteners 48" o.c. on ceilings.

These assemblies are completed with a U.S.G. joint treatment system and decorating—both steps unnecessary in walls, however, when predecorated vinyl-surfaced TEXTONE Gypsum Panels are used.

Three alternate framing methods with wood studs spaced 16" o.c. provide load-bearing assemblies developed to meet fire resistance and sound control requirements in partitions:

1. Conventional 2x4 stud construction, two layers 5/8" SHEETROCK SW FIRECODE Gypsum Panels, or FIRECODE or regular SHEETROCK SW over base layer of 1/4" SHEETROCK Gypsum Panels. These offer higher sound and/or fire ratings than did the original double wall assembly employing two layers of 3/8" SHEETROCK.
2. Double row of 2x3 staggered studs set on separate plates 1" apart, with single layer of 5/8" SHEETROCK SW FIRECODE panels and 2" THERMAFIBER Insulating Blankets in the cavity. This provides sound isolation, STC of 51, where one-hour fire resistance (load bearing) is required. With 2x4 staggered studs on a common 2x6 plate and double layer 5/8" SHEETROCK FIRECODE "C" Panels, 2-hour fire resistance is obtained.
3. Double row of 2x4 studs set on separate plates 1" apart, with double layer 5/8" SHEETROCK FIRECODE "C" offers sound isolation of 51 STC, 2-hour fire resistance and chase space required for party walls in garden apartments. With 3 1/2" blankets in one cavity, sound attenuation increases to 56 STC.

Resilient Attachment—SHEETROCK SW Gypsum Panels are screw-attached to RC-1 SHEETROCK Resilient Channels, also (continued on page 3)



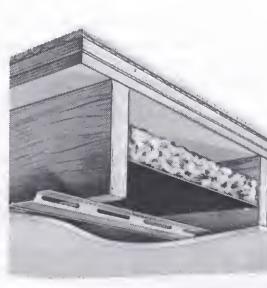
single-layer
staggered stud
partition



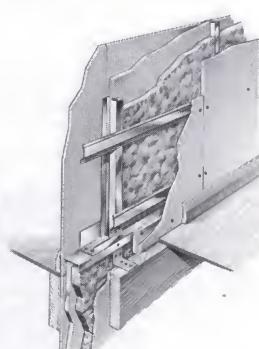
double-layer
partition



single-layer
resilient partition



single-layer
resilient ceiling



cavity-type
separation wall

test data/partitions

partition applications

fire rating	description	test no.	stc rating	comments
			11-f 16-f	
45 min.	Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c.—panels nailed 7" o.c.—1½" cem ctd nails—joints fin wt 6 width 4%	UL Des U317 (was 1-45 min)	(f)	
1 hr.	Wd Stud—Resil ½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" or 24" o.c.—3" THERMAFIBER ins blks—RC-1 chan one side spaced 24" o.c.—panels att with 1" Type S screws—opp side direct att with 1¼" Type W screws—joints fin—perimeter caulked wt 7 width 5¾"	UL Des U311 (was 27-1 hr)		
1 hr.	Wd Stud—Resil ½" SHEETROCK FIRECODE gypsum panels—2x4 16" o.c.—RC-1 chan both sides spaced horiz 24" o.c. att with 6d nails—panels att with 1" Type S screws—joints fin—perimeter caulked wt 7 width 5¾"	T-1396-OSU TL-60-52	(f) (s) 45	Fully resilient 1-hr. fire rated party wall
1 hr.	Wd Stud—½" SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16" or 24" o.c.—panels nailed 7" o.c.—1½" cem ctd nails—joints fin—perim caulked wt 7 width 4¾"	UL Des U305 (was 5-1 hr) UL Des U314 (was 38-1 hr) BBN-700725 USG-30-FT-G&H (s)	46	UL Des U314 based on 24" stud spacing. BBN test includes 3" insul. blankets. USG-30-FT based on 16" stud spacing
1 hr. est	Stag Wd Stud—½" SHEETROCK FIRECODE gypsum panels—2x3 16" o.c.—2x3 plates 1" apart—panels att with 1¼" Type W screws 16" o.c.—2" THERMAFIBER sound atten blks one side—perim caulked wt 8 width 7½"	USG-106-FT-G&H (s) USG-155-FT-G&H (s)	51 49	Best value in 50 stc range for this type of party wall. 155-FT based on 2x6 common plate
1 hr. est	Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c.—2 layer—base layer ¼" SHEETROCK gypsum panels appl vert with 4d ctd nails—½" panels face layer strip lamin—joints stag & fin—perimeter caulked wt 8 width 5¾"	USG-221-ST-G&H (s) TL-69-52	53 45	221-ST based on ½" lamin. face layers & 1½" THERMAFIBER sound atten. blankets
1 hr. est	Stag Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c. on 2x6 com plate—panels att with 6d ctd nails 7" o.c.—2" THERMAFIBER sound atten blks one side—perim caulked—joints fin wt 8 width 6¾"	TL-69-213	(s) 45	
1 hr.	Wd Stud—2 layers ½" SHEETROCK gypsum panels lamin & nailed—2x4 16" o.c.—joints fin wt 7 width 5¾"	T-118-48-OSU TL-57-14	(f) (s) 38	
2 hrs.	Wd Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16" o.c.—2" THERMAFIBER sound atten blks—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin wt 13 width 6¾"	T-4799-OSU	(f)	
2 hrs. est	Wd Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16" o.c.—3" THERMAFIBER ins blks—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin wt 12 width 6¾"	TL-67-239 TL-67-212	(s) (s) 59 49	Exceptional sound control for party walls. TL-67-212 based on same construction without blankets
2 hrs.	Wd Stud—2 layers ¾" SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16" o.c.—base layer 6d nails 6" o.c.—face layer lamin or nailed to base—joints fin wt 12 width 6¾"	UL Des U301 (was 4-2 hr)	(f) N/A	Basic 2-hour partition construction
2 hrs. est	Wd Stud—2 layers ¾" SHEETROCK FIRECODE "C" gypsum panels—2 rows 2x4 16" o.c. on sep plates 1" apart—base layer att with 6d ctd nails 16" o.c.—face layer att with 7d ctd nails 7" o.c.—perim caulked—joints fin wt 13 width 10¾"	USG-710120 TL-69-214	(s) (s) 56 51	USG-710120 based on 3½" thick blankets in one cavity
2 hrs. est	Stag Wd Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c. on 2x6 com plate—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin wt 13 width 8½"	TL-69-211	(s) 47	

NOTE: Partition width based on 3½" stud width.

wall furring applications

—	RC-1 Resilient Channels 24" o.c.—½" Foil-Back SHEETROCK gypsum panels screw attached—joints finished	—	—	RC-1 channel reduces transfer of structural stresses to surface
—	Wood furring strips 16" o.c.—½" Foil-Back SHEETROCK gypsum panels—joints finished	—	—	Surface not isolated from structural stresses

For ceiling applications, see page 6; for area separation walls, see page 9.

description/technical data

(continued from page 1)

screw-attached 24" o.c. to the framing. These galvanized metal channels "float" the panels away from the framing; provide a spring action that isolates the gypsum panel surface. These systems combine highly effective sound isolation with lightweight low-cost construction.

An excellent value in wood frame party walls consists of single-layer $\frac{5}{8}$ " SHEETROCK SW FIRECODE Gypsum Panels, resiliently attached to one side of studs and directly attached to the other side, plus 3" THERMAFIBER Insulating Blankets pressed tightly into the stud cavity. This lightweight partition is widely used for its high sound value, STC 52, at costs which are little more than for conventional partition systems. It also offers 1-hour rated fire resistance; often chosen for use between units in garden apartments and other buildings.

Where exceptional sound control, greater fire resistance and strength are required, double-layer drywall construction is used with THERMAFIBER Blankets and RC-1 channels applied one side of wood studs (see table, page 2).

Area Separation Walls—fast-erecting non-load bearing drywall partitions for low-cost fire barriers in wood-frame multi-family housing (see page 9).

Wall Furring—Foil-Back SHEETROCK SW Gypsum Panels provide an economical, efficient vapor barrier and a readily decorated interior surface for exterior walls. Panels are attached to wood furring strips 16" o.c. or screw-attached to RC-1 SHEETROCK Resilient Channels 24" o.c. The resilient channels reduce the transfer of structural stresses to the gypsum panel wall surface.

Gypsum panels for these assemblies are available in five thicknesses and nine types. SHEETROCK SW Gypsum Panels have an eased edge specially designed to resist joint deformation. SHEETROCK SW FIRECODE Panels, with a specially formulated core, obtain higher fire-resistance ratings than plain SHEETROCK Panels. SHEETROCK W/R (water-resistant) Panels are an ideal tile base for tub and shower areas. Exterior Gypsum Ceiling Board offers superior sag and water resistance plus excellent paintability in exterior soffits. Lightweight PYROROCK Sound Underlayment Board provides high performance and dry installation over plywood subfloors in multi-family dwellings.

SHEETROCK Panels are easily screw-applied to channel-type galvanized metal studs. See U.S.G. Folder SA-923 for details.

limitations

1. Maximum frame spacing:

Double layer: 16" o.c. if fire rating is required, also for ceilings with $\frac{3}{8}$ " base layer; 24" for ceilings with $\frac{1}{2}$ " base layer applied with long dimension applied across framing, also for all double-layer sidewalls if fire rating of one hour or more is not required.

Single layer: ceilings— $\frac{3}{8}$ " SHEETROCK, 16" o.c.; $\frac{1}{2}$ " and $\frac{5}{8}$ " SHEETROCK, 16" o.c. if applied with long edge parallel to framing or 24" o.c. if applied across the framing. Sidewalls— $\frac{3}{8}$ " SHEETROCK, 16" o.c.; $\frac{1}{2}$ " and $\frac{5}{8}$ " SHEETROCK, 24" o.c.

Resilient channel: 24" o.c. for joists 16" o.c.; 16" o.c. for joists 24" o.c.

2. USG Brand Type S Screws must be used for attachment of single-layer panels to RC-1 Resilient Channels.

3. RC-1 Resilient Channels must be attached to the bottom face of wood floor joists with 1 $\frac{1}{4}$ " USG Brand Type W or 1" Type S Screws. Nails must not be used. For fire-rated construction, use 1 $\frac{1}{4}$ " Screws, Type S or W.

4. Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting "Wood Framing Requirements" shown in U.S.G. Gypsum Panels Product Folder SA-927.

5. Direct attachment to wood framing with fastener penetration into wood exceeding 1" is not recommended except where required to meet fire rating.

6. Not recommended for exterior soffits and ceilings which project upwards and away from the building proper.

7. SHEETROCK Panels are not recommended where exposure to moisture is extreme or continuous. Specially formulated SHEETROCK W/R Panels are recommended as a base for wall tile in bathrooms and other high-moisture areas.

thermal resistance (R) value— Foil-Back SHEETROCK panels (1)

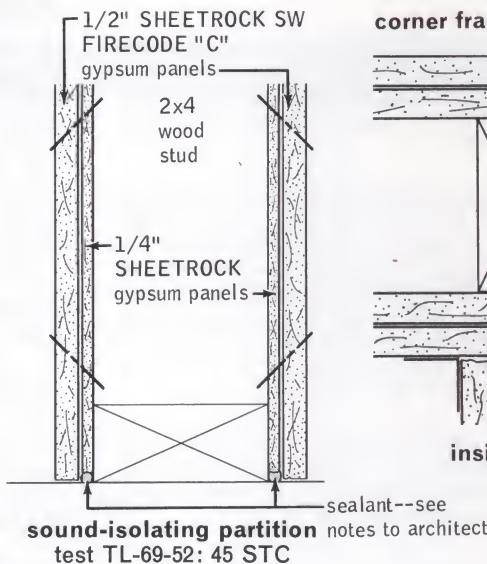
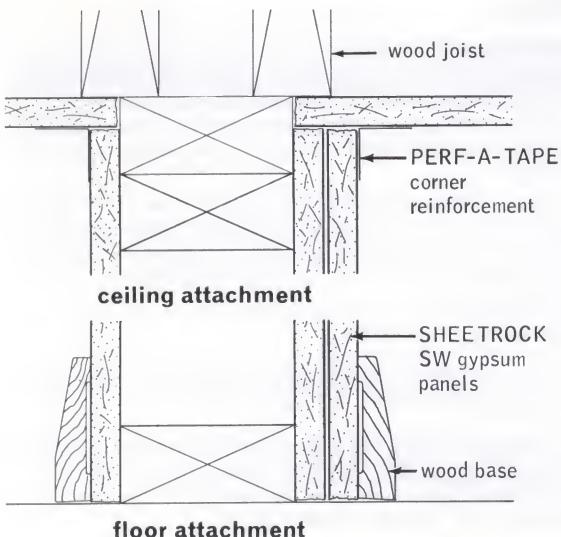
thickness	$\frac{1}{2}$ "	$\frac{5}{8}$ "
wall application	3.93	4.03
ceiling application		
summer conditions	4.94	5.04
winter conditions	2.73	2.83

(1) Resistance based on inside still air film, panel thickness and one reflective surface facing a $\frac{1}{4}$ " min. still air space.

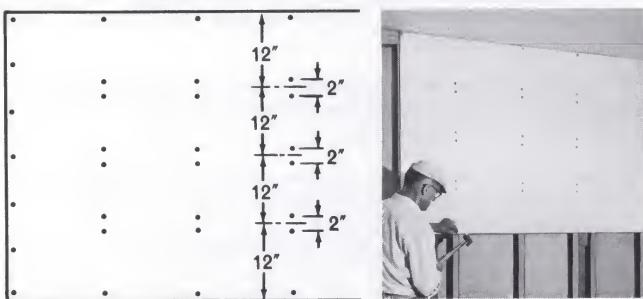
sound transmission loss—db

test no.	method	band center frequency—Hz																		STC			
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800	3150	4000	
TL-67-239	Lab	35	41	—	47	53	56	—	57	59	60	—	61	63	64	—	65	65	64	—	59	61	59
USG-710120	Field	43	40	—	46	49	48	—	49	51	54	—	56	59	60	—	64	66	66	—	65	71	56
USG-221-ST-G&H	Lab	30	37	—	42	47	48	—	48	48	51	—	55	57	58	—	59	59	57	—	59	62	53
USG-33-FT-G&H	Lab	32	—	36	—	42	—	46	—	52	—	54	—	58	—	55	—	53	—	53	—	54	52
USG-106-FT-G&H	Lab	28	—	39	—	43	—	47	—	53	—	57	—	60	—	64	—	59	—	60	—	65	51
TL-69-214	Lab	31	35	—	34	39	44	—	48	51	53	—	56	56	59	—	57	50	53	—	59	59	51
USG-155-FT-G&H	Lab	26	—	34	—	44	—	47	—	50	—	52	—	53	—	57	—	58	—	55	—	60	49
TL-67-212	Lab	26	30	—	33	39	42	—	47	49	52	—	55	57	60	—	61	61	58	—	53	56	49
TL-69-211	Lab	30	33	—	35	40	40	—	42	44	46	—	49	51	52	—	52	48	48	—	53	57	47
BBN-700725	Lab	31	31	—	36	38	39	—	41	42	46	—	49	51	52	—	54	49	45	—	48	52	46
TL-60-52	Lab	29.5	—	32.5	—	39.5	—	43.5	—	46	—	48	—	50	—	51	—	49	—	44	—	49	45
TL-69-52	Lab	21	28	—	34	35	39	—	41	41	46	—	49	51	54	—	56	55	53	—	52	55	45
TL-69-213	Lab	25	31	—	35	37	41	—	40	40	43	—	46	46	51	—	51	47	47	—	51	54	45
USG-30-FT-G&H	Lab	17	—	16	—	34	—	30	—	35	—	40	—	42	—	45	—	38	—	39	—	44	34

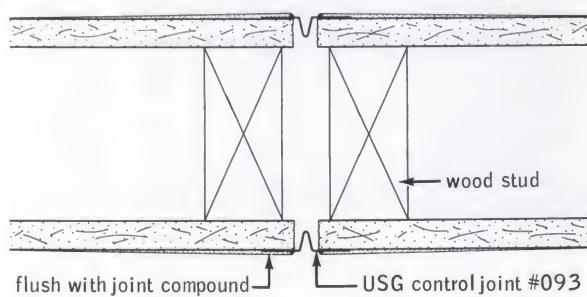
details/partitions



double-nailing application

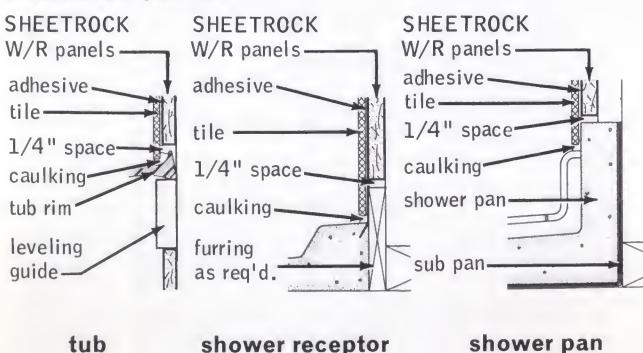


wall control joint



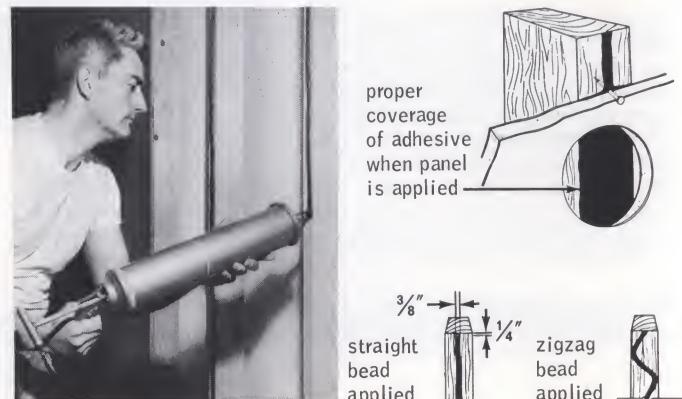
tub and shower details—SHEETROCK W/R panels

single-layer panels

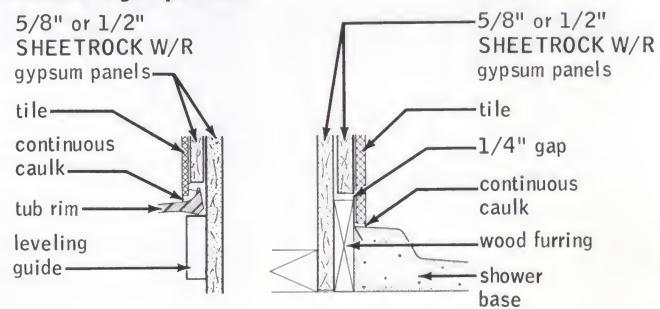


For full information on systems shown here, see U.S.G.
Gypsum Drywall Construction Handbook WB-52.

adhesive nail-on application

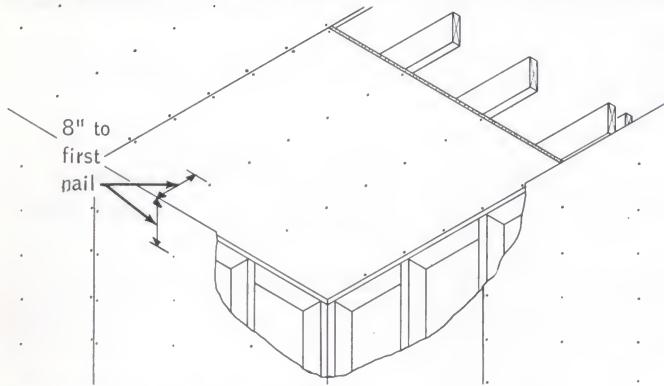


double-layer panels

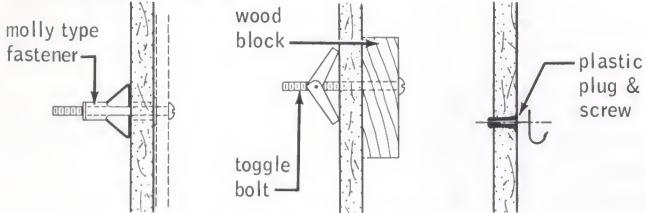


details/partitions

floating interior angle system



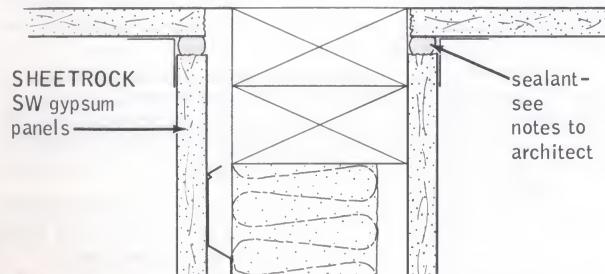
fixture attachments—light



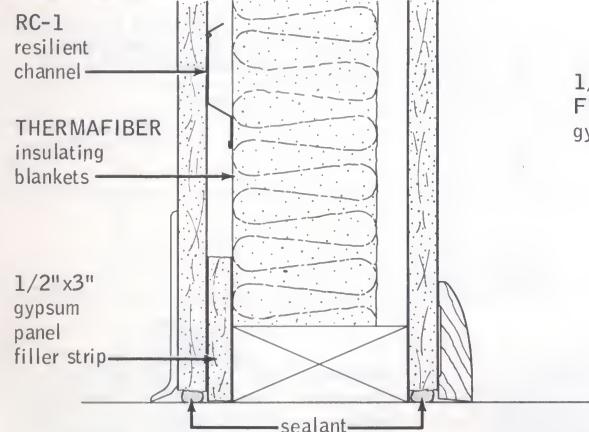
fastener load table

type fastener or attachment	allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
1/4" molly bolt into 1/2" SHEETROCK Panels only	35	80
1/4" toggle bolt into 1/2" SHEETROCK Panels only	40	60
No. 8 sheet metal screw in plastic plug	20	40

ceiling attachments



floor attachments

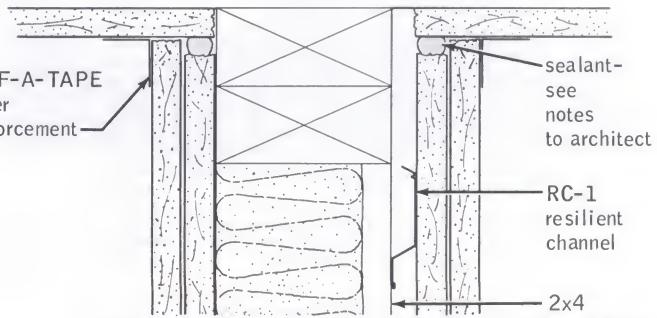
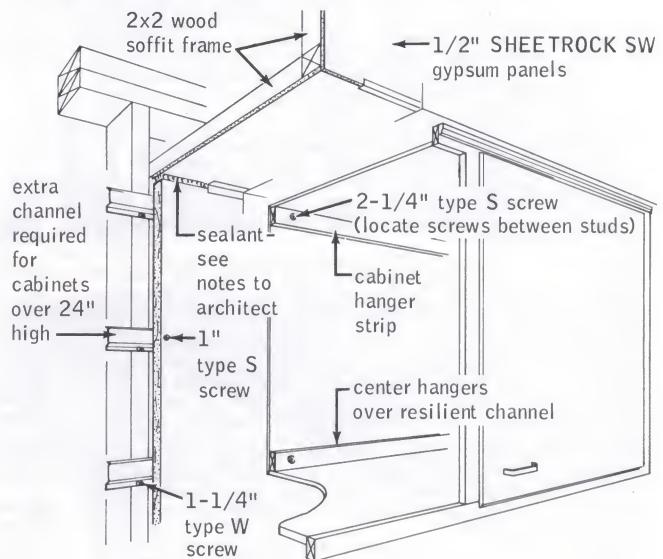


sheet lamination

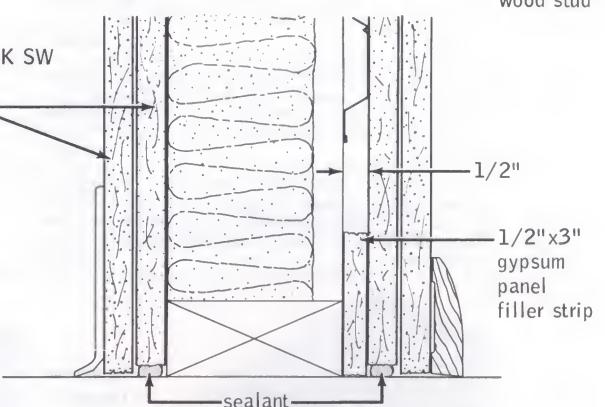


strip lamination

cabinet attachment



1/2" SHEETROCK SW FIRECODE "C" gypsum panels

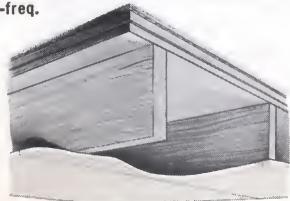


test data/ceilings

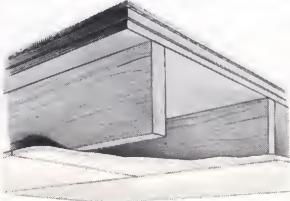
fire rating	description	test no.	sound rating		comments
			STC	IIC	
1 hr.	½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin clg wt 3	UL Des L512 (was 42-1 hr) NBS-77 P-716 (s)	(f) 36†		Basic assembly—sound attenuation test
1 hr.	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom plywd & MASTICAL underlayment compd or wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L514 (was 41-1 hr)	(f)	N/A	Fire rating also applies with FLO-FILL underlayment compound
1 hr.	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" PYROROCK underlayment bd over ½" plywd subflr—(1) ½" vinyl flr tile (2) 66-oz carpet & 40-oz pad—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L523 USG-740307 (1) USG-740302 (2) USG-740308 (s) (s) (s)	(f) 49 45 58		Fire rating also applies with direct-attached gypsum panel ceiling. Sound ratings based on ½" thick gypsum panels
1 hr.	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1½" perlite-sand conc over ½" plywd subfloor—2x10 wd joist 16" o.c.—3" glass fiber batts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L516 (was 62-1 hr)	(f)	N/A	
1 hr. est	Resil ½" SHEETROCK gypsum panel ceiling—¾" MASTICAL underlayment compd or PYROROCK bd over ½" plywd subflr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	BBN-670601 & 670602 (s)	56	54	
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-6 (½" FIRECODE "C") CK-6412-10 (½" reg SHEETROCK)	(s) 47 47	39 39	
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-7 (½" FIRECODE "C") CK-6412-9 (½" reg SHEETROCK)	(s) 47 48	67 66	
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-9 (½" FIRECODE "C") CK-6412-3 (½" reg SHEETROCK)	(s) 51 50	46 46	
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-8 (½" FIRECODE "C") CK-6412-4 (½" reg SHEETROCK)	(s) 52 51	71 70	
1 hr.	½" SHEETROCK FIRECODE "C" gypsum panel ceiling—½" plywd & 1" MASTICAL or FLO-FILL underlayment compd sub flr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin clg wt 3	UL Des L512 (was 42-1 hr) BBN-671007 & 671008 (s)	(f) 48	35	BBN-671007 & 671008 based on 1¼" thick MASTICAL floor underlayment
1 hr.	½" SHEETROCK FIRECODE gypsum panel ceiling—Amer Plywood Assn 2-4-1 flr 4x10 wd joist 48" o.c.—USG met fur chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L508 (was 28-1 hr)	(f)	N/A	Only 1-hr. residential drywall system based on 48" joist spacing
1 hr.	½" SHEETROCK FIRECODE gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin clg wt 3	UL Des L501 (was 1-1 hr) CK-6412-7 CK-6412-8 (s) (s)	(f) 38 39	32 56	In CK-6412-8 test, 44-oz. carpet & 40-oz. pad added atop flooring
1 hr. est	½" SHEETROCK gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—panels att with 6d nails 6" o.c.—joints fin clg wt 3	CK-6412-6 CK-6412-5 (s) (s)	41 40	32 58	In CK-6412-5 test, 44-oz. carpet & 40-oz. pad added atop flooring
1½ hrs.	Resil 2 layers ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw att over base layer panels—face layer screw att to chan 12" o.c.—joints fin clg wt 5	UL Des L510 (was 22-½ hr)	(f) 50 est		
2 hrs.	Resil 2 layers ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw att over base layer panels—face layer screw att to chan 12" o.c.—joints fin clg wt 5	UL Des L511 (was 272-2 hr)	(f) 50 est		

†Based on 11-freq.

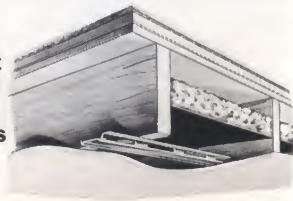
single-layer ceiling



double-layer ceiling



resilient channel with blankets



description/ceilings

In single-layer ceiling assemblies, SHEETROCK SW Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6" to 7" o.c. (6" for fire-rated construction); 1 1/4" USG Brand Type W Screws are spaced 12" o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing (see page 4 for details).

Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1 SHEETROCK Resilient Channels are screw-attached across wood joists; gypsum panels are attached to channels with USG Brand Type S Screws. A one-hour fire rating is available with 1/2" SHEETROCK FIRECODE "C" Gypsum Panels. With a double-layer 5/8" SHEETROCK FIRECODE "C" Panels separated by RC-1 Resilient Channels, a 2-hour rating is provided. When 3" THERMAFIBER Insulating Blankets are installed between joists, airborne and impact sound ratings are greatly improved (see table, left).

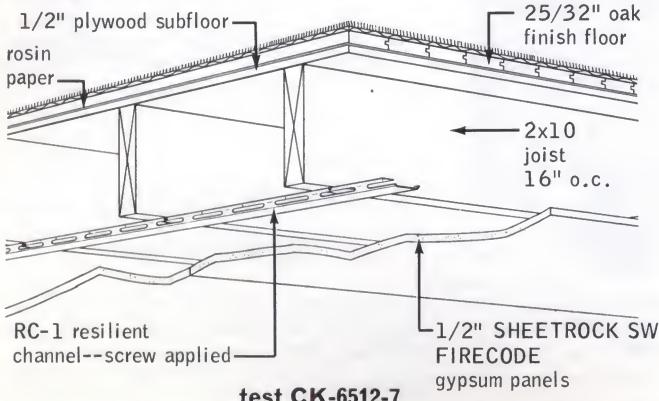
Floor/ceiling sound resistance is improved by using underlayment compound or special gypsum board over plywood or T&G sub-base. MASTICAL and FLO-FILL are super-strength gypsum cement underlays which are poured in place over plywood and troweled smooth. PYROROCK Sound Underlayment Board, a specially formulated square-edge gypsum board, is nail-attached for completely dry floor construction. These underlays produce a durable, structural subfloor system suitable for finishing with carpet and pad, resilient tile or wood parquet. With either directly or resiliently attached gypsum panel ceilings, these systems also provide excellent fire resistance which makes them suited for motels and multi-story apartments (for details and specifications, see U.S.G. Bulletins IR-165 for MASTICAL, IR-552 for PYROROCK).

Exterior Soffits—eaves, canopies and carports and other exterior soffit applications with indirect exposure to the weather are quickly and economically completed with USG Exterior Gypsum Ceiling Board fastened directly to joists (see U.S.G. Bulletin WB-1152 for detailed specification).

Radiant Heated Ceilings—specially formulated components are also used extensively in electric cable radiant heated ceilings. A single layer of USG R.H. Base attached to joists, provides a base for electric radiant heat cable and following 1/4" thickness of SHEETROCK R.H. Filler. This special system allows higher cable temperatures than with other gypsum products, provides more efficient heat transmission and greater resistance to heat deterioration. See U.S.G. Bulletin P-480.

Maximum frame spacing and other limitations for these systems are shown on page 3.

ceiling and floor assemblies



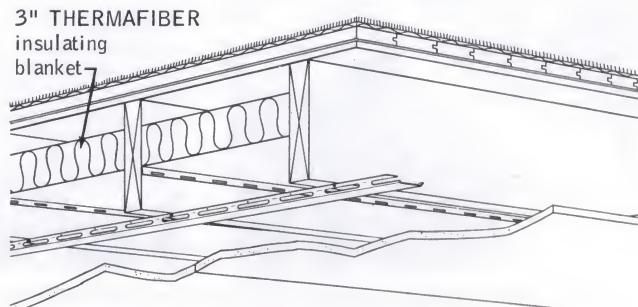
test CK-6512-6—same but without carpet & pad



resilient ceiling application



direct ceiling application

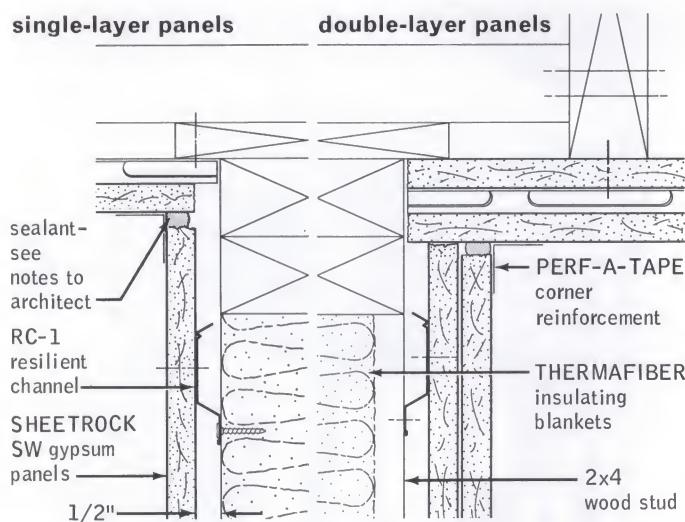


test CK-6512-8

test CK-6512-9—same but without carpet & pad

details/ceilings

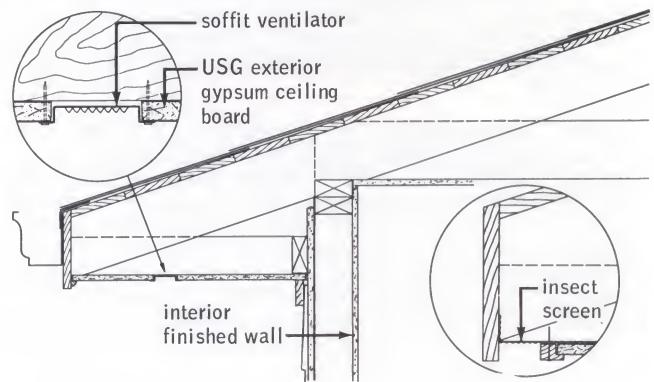
single-layer panels



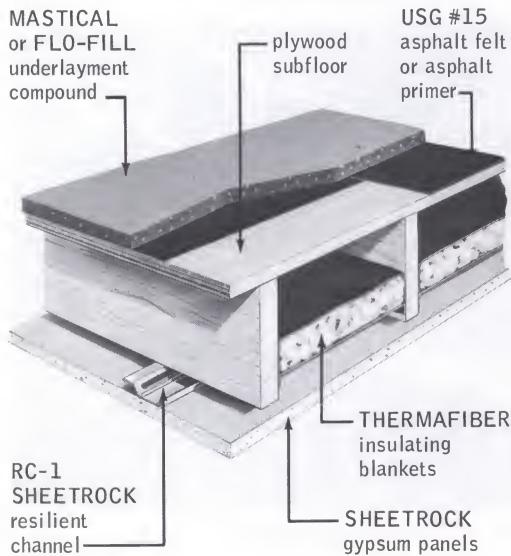
double-layer panels



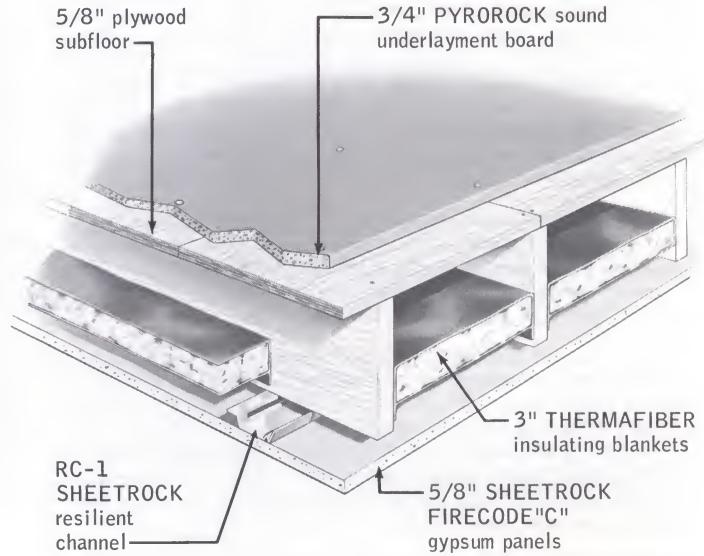
exterior soffit



underlayment compound application



underlayment board application



back-blocking procedure

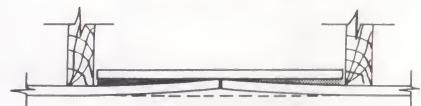


A. Gypsum panels are applied with long edges at right angles to joists. Backing blocks 8" wide, cut from scrap panels, are cemented and placed along full length of edge and ends of panels. Floating of end joints compensates for a twisted stud or joist.

B. Immediately after all blocks are in place, the next panel, which had been previously cut, is erected. Ends are loosely butted.



braces in place



braces removed

C. Cross section shows how floated end joint is tapered and back-blocked. Brace is temporarily nailed over wood strip (top drawing) which depresses ends of panels. When strips are removed, tapered formation remains as shown at bottom.

2. Maximum frame spacing: 24".

1. Non-load bearing construction.

Limitations

costly winter construction delays.

Weather Resistance—Moisture-resistant components permit installation in any weather men can work—eliminate many costly winter construction delays.

Space-Saving—Use of these assemblies gains valuable floor space. Thicknesses is 3 3/4" to 4 1/4" for Cavity Walls, compared to 8" to 12" for a masonry wall without interior finish.

Less than masonry walls usually used. Their light weight

types (see table above).

Sound Isolation—STC ratings up to 57 are available in both

Lightweight—These drywall assemblies weigh at least 50%

less than masonry walls usually used.

Fine Resistance—Both types of USG Area Separation Walls

offer 2-hr. fire ratings; the cavity type also offers a 3-hr.

or 4-hr. fire rating (see table above).

Sound gypsum concrete.

These systems may be used in buildings up to four stories high

and with all common floor-ceiling heights found in multi-family

housing. Both cavity and solid solid for exterior

walls with appropriate weather-resistant facings when offset

shoping roofs are desired; also for use with flat decks of wood

or poured gypsum concrete.

With prepared edges, are available in lengths up to 12 ft. to

meet job requirements.

Firecode—Panels have a water-resistant gypsum core

encased in multi-layer paper chemically treated to combat

fire. These panels are suitable for use with gypsum liner

in vinyl film to resist water damage. SHEETROCK W/R

The Thermafiber Sound Attenuation Blanks are wrapped

hot-dipped galvanized steel for added corrosion resistance.

Structural studs and special studies for these systems are formed from

Panels shed water, protect the special fire-resistant core.

Temporary exposure to inclement weather during construction

Components used in these systems are designed to permit

exposure to fire. They permit a fire-damaged structure to

collapse without causing the fire barrier to fail. With 24-ga.

steel H-studs, the assembly is suitable for floor-to-ceiling

heights up to 10 ft. without exceeding 1/240 allowable deflection.

USG Area Separation Walls are remarkable new develop-

ments for constructing common walls with fire-resistant pro-

tection in two adjacent properties. These lightweight, non-load

bearing gypsum drywall assemblies are designed as vertical

panels set between T-studs—USG gypsum liner

panels set between T-studs 24" o.c.—RC-1

cham 24" o.c. screw att to side opp liner panels 1 1/2"

att with 1 1/4" Type W liner panels 12" o.c.—joints slgs &

on 2x3 plates 1" from liner panels 24" o.c.—single layer

beam USG stl T-studs 24" o.c.—RC-1

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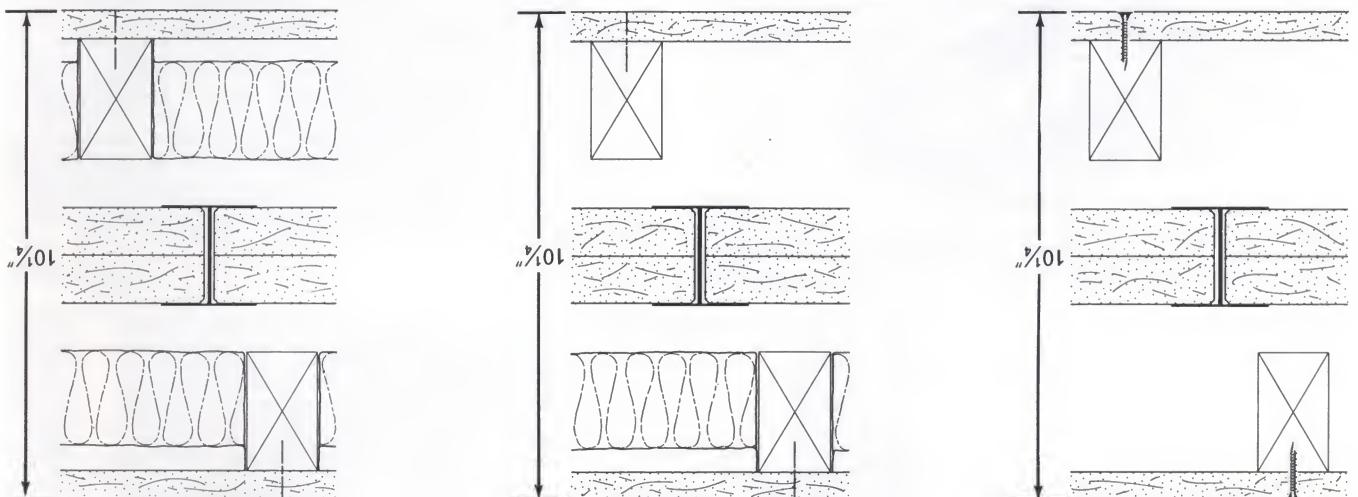
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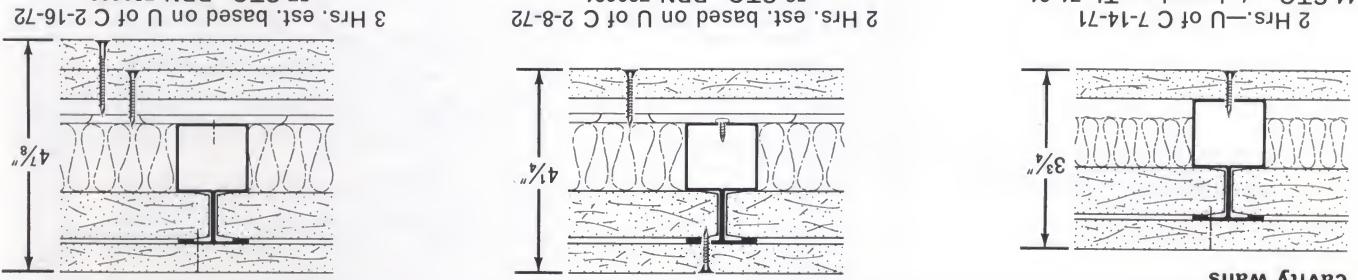
beam USG stl T-studs 24" o.c.—RC-1

panels set betw USG stl T-studs 24" o.c.—RC-1

components



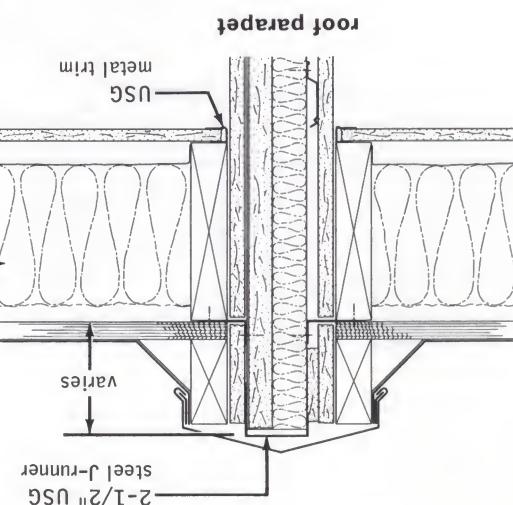
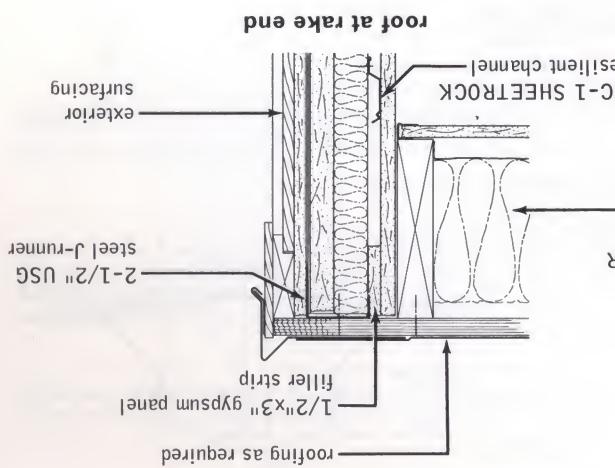
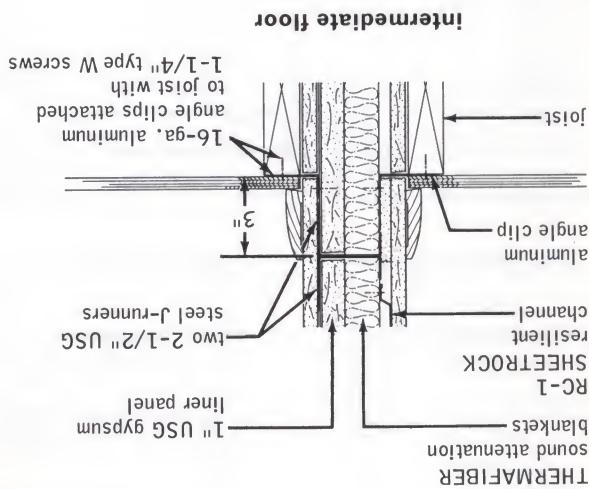
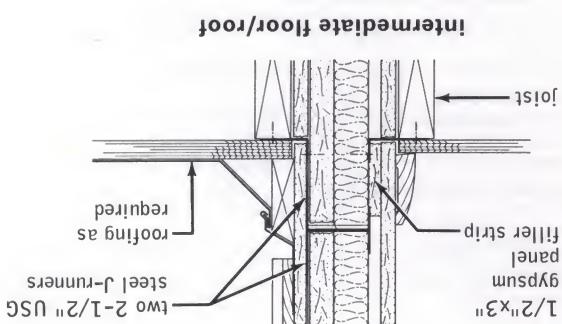
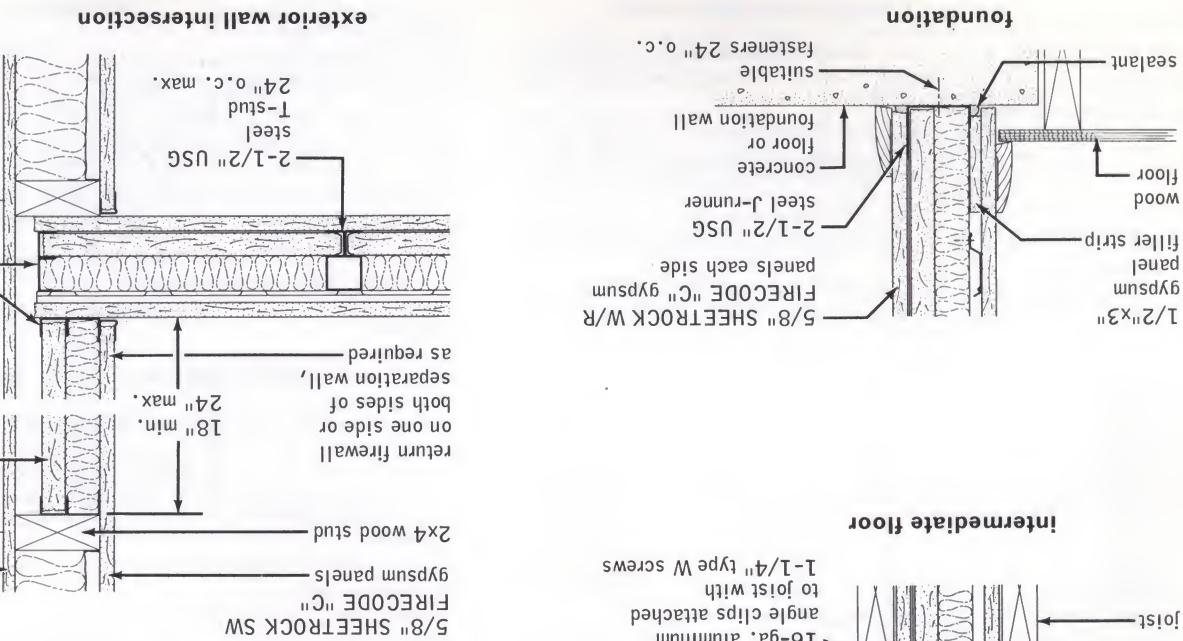
solid walls



cavity walls

rated assemblies

area separation walls



scale: 1 1/2" = 1'-0"

924

SHEETROCK & Wood Framing

partitions / ceilings / separation walls

SA

area separation walls/cavity type

foundation

- 2" USG steel j-runner
- fasteners
- suitables
- 24" o.c.
- sealant
- joist
- two 1" gypsum liner panels

intermediate floor

- 2" USG steel j-runnners
- insulation
- angle clip
- aluminum pan head screw
- 3/8" type S
- blanks
- insulating
- THERMAFIBER
- each floor level
- fiber blocking at
- each floor level

root parapet

- 2" USG steel j-runner
- 2x4 stud
- framing side
- each floor level
- angle clips at
- 16-ga. aluminum
- varies
- 2" USG steel j-runner

Part 3: execution

3.1 single-layer systems

3.1.1 gypsum panel erection—direct attachment

Apply gypsum panels to ceilings first, then to walls. Place panels (horizontally—right angles to framing) (vertically—parallel to framing). Position all ends over framing members in vertical application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses. Place end joints on opposite sides of partitions on different studs. When necessary, cut ends, edges and cutouts within the field of the panel in a workmanlike manner.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space perimeter fasteners at least $\frac{3}{8}$ " from ends and edges. Drive nails home with heads slightly below surface of panels to provide a uniform dimple. Do not use a nail set; avoid breaking face paper.

Attach gypsum panels to framing supports by;

- a. **Standard single nailing method**—Attach panels with specified nails spaced 7" o.c. max. for ceilings, 8" o.c. max. for walls.
- b. **Adhesive-nail-on method**—Attach gypsum panels with DURABOND (200) (300) Adhesive applied in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two panels meet on a framing member, apply a serpentine bead with an 8" repeat pattern permitting adhesive contact to both panels. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following panel erection, apply fasteners per manufacturer's directions. Impact panel by hand along framing to insure good contact at all points.
- c. **Double-nailing method**—Attach gypsum panels with nails spaced 12" o.c. with second nails in close proximity (2").
- d. **Power-driven USG Brand Screws**—Attach gypsum panels with 1 $\frac{1}{4}$ " USG Brand Type W screws—spaced 12" o.c. max.
- e. **DURABOND Vinyl Foam Tape**—Attach gypsum panels, using DURABOND (200) (300) Adhesive and DURABOND Vinyl Foam Tape applied in 8" long strips according to manufacturer's directions.

3.1.2 predecorated TEXTONE Gypsum Panel erection

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically to framing spaced (16") (24") o.c. Position less-than-full-width panels with cut edge at corner.

Apply DURABOND (200) (300) Adhesive in continuous $\frac{3}{8}$ " beads to face of studs in field of panel and in two $\frac{3}{8}$ " beads at extreme edges of studs at vertical joints. Position panels within 15 min. after adhesive application and mechanically fasten 16" o.c. along ceiling and floor edges of panels. Impact panel by hand along framing to insure good contact at all points.

Finish panel joints, edges and corners with TEXTONE Moldings matching specified panel finishes and installed according to manufacturer's directions.

3.1.3 SHEETROCK W/R Gypsum Panel erection

a. **Framing**—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over $\frac{5}{16}$ " thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.

b. **Gypsum Panels**—After tub, shower pan or receptor is installed, place temporary $\frac{1}{4}$ " spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, apply SHEETROCK W/R Sealant to all cut or exposed panel edges at utility holes, joints and intersections.

Install panels horizontally with paperbound edge abutting top of spacer strip. Fasten panels with nails 8" o.c. max., or screws 12" o.c. max. Where ceramic tile more than $\frac{5}{16}$ " thick will be used, space nails 4" o.c. max. and screws 8" o.c. max.

In areas to be tiled, treat all fastener heads with SHEETROCK W/R Sealant. Do not apply joint compound to joints or fastener heads

in areas to be tiled. Apply joint treatment only to joints and fasteners *not* to be tiled.

Prior to tile erection, fill all openings around pipes, fittings and fixtures with specified caulking compound. Remove spacer strip but do not caulk gap at bottom edge of panels.

Note—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between tile and shower floor or tub.

3.1.4 back-blocking system

Note—Maximum spacing of supports, 24" o.c. Select Sections a or b, depending upon job requirements. Floating and tapering end joints requires back-blocking. However, end joints may be back-blocked without tapering.

- a. Float, back-block and taper all ceiling end joints except at perimeter of room.
- b. Back-block all ceiling edge joints except at perimeter of room.
- c. Apply SHEETROCK SW Gypsum Panels with long edges at right angles to framing and with end joints midway between supports. Wood backing behind joints between framing supports is not required. Use $\frac{3}{8}$ " or $\frac{1}{2}$ " thick gypsum backing blocks for $\frac{1}{2}$ " ceiling finish; $\frac{1}{2}$ " or $\frac{5}{8}$ " thick blocks for $\frac{5}{8}$ " ceiling finish. Apply adhesive to face side if foil-backed blocks are used.

3.1.5 floating interior angle system

Apply gypsum panels to ceilings first. Follow standard framing practices for corner fastening. Fit panels snugly at all angles. Apply gypsum panels to walls to maintain firm support for ceiling panels. At horizontal angles, apply the first fastener 8" from the intersection. At vertical interior angles attach the overlapping panel only, at the angle. Use conventional fastening in remainder of area.

3.2 double-layer systems

3.2.1 base layer erection—direct attachment

a. **Ceilings**—Apply gypsum panel base layer on ceilings first (horizontally—right angles to framing) (vertically—parallel to framing). Position end joints to offset face layer joints by at least 10"; joints may occur on or between framing members. Apply foil-back panels with foil side against framing.

b. **Sidewalls**—Apply gypsum panel base layer with long edges centered on framing members (vertically). When predecorated face layers will be used, apply base layer horizontally. Apply foil-back panels with foil side against framing. Attach panels to framing supports by (screw) (nail) attachment as follows:

c. **Screw Attachment**—Attach panels with power-driven 1 $\frac{1}{4}$ " type W screws spaced 12" o.c. max. For walls with studs 16" o.c., screws may be applied 16" o.c. max. Stagger screws on adjoining edges and ends.

d. **Nail Attachment**—Attach panels with specified nails spaced 7" o.c. max. on ceilings 8" o.c. max. on walls. Drive nails so heads are flush with surface and opposite each other on adjacent ends and edges.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space fasteners $\frac{3}{8}$ " min. from ends and edges.

3.2.2 face layer erection—direct attachment

Use gypsum panels in maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints at least 10" from parallel joints in base layer. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

After panels are cut to size, mix and apply adhesive according to manufacturer's directions and laminate face layer to base layer in the following manner:

Sheet Lamination—For fire-rated construction, apply DURABOND Joint Compound-Taping to entire back surface of face panels and to extreme edges of panels. Apply adhesive in beads approximately $\frac{3}{8}$ " wide at base and $\frac{1}{2}$ " high and spaced 4 $\frac{1}{2}$ " o.c. Laminate face layer to base layer using moderate pressure and temporary support or supplemental fastening as follows:

a. Temporary nailing—Use nails with at least $\frac{3}{4}$ " penetration into framing. Space nails 16" to 24" o.c. When proper bond is developed, remove nails and dimple holes for joint treatment.

b. Temporary supports—Brace or shore face layer every 16" to 24". When proper bond is developed, remove supports.

c. USG Brand Screws—Permanently attach face layer with $1\frac{1}{2}$ " type G screws. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of ends.

Strip Lamination—For fire-rated construction, apply DURABOND Joint Compound-Taping or 90 to base layer panels in vertical strips of four $\frac{1}{2}$ " beads, $1\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c. Permanently attach face layer with $1\frac{1}{2}$ " type G screws placed to penetrate adhesive strips. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of ends.

For non-rated construction, laminate face panels to base layer as follows:

DURABOND 500 Adhesive—Apply adhesive in strips using notched spreader having $\frac{1}{4}$ " x $\frac{1}{4}$ " min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten as required. For walls, use pre-bowed panels, erect panels vertically and fasten 16" o.c. at top and bottom of panel. For ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member at mid-width of panel.

DURABOND 600 Adhesive—Apply adhesive to both contact surfaces; let adhesive air dry until color turns from lighter to darker blue; erect panels as soon as possible after drying. Position panel, press panel firmly in place and fasten as required. For horizontal application to walls and for all ceiling applications, fasten face panel at each corner and along edges spaced 48" o.c. max. For vertical application to walls, use pre-bowed panels and fasten 16" o.c. at top and bottom of panel.

DURABOND Vinyl Foam Tape—Attach gypsum panels, using DURABOND 500 Adhesive and DURABOND Vinyl Foam Tape applied in continuous strips across back face of panel according to manufacturer's directions.

3.2.3 face layer erection—TEXTONE Gypsum Panels

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically with joints staggered at least 10" from parallel joints in base layer. Position less-than-full-width panels with cut edge at corner. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

For fire-rated construction, install panels using DURABOND Joint Compound-Taping or 90 as laminating adhesive. Apply adhesive to base layer in vertical strips of four $\frac{1}{2}$ " beads, $1\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c. Fasten panels 16" o.c. at top and bottom of panel.

For non-rated construction, install face layers using DURABOND (500) (600) Adhesive as follows:

a. DURABOND 500 Adhesive—Apply adhesive in strips using notched spreader having $\frac{1}{4}$ " x $\frac{1}{4}$ " min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

b. DURABOND 600 Adhesive—Apply adhesive to both contact surfaces; let adhesive air dry until color turns from lighter to darker blue; erect panels as soon as possible after drying. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

Finish panel joints, edges and corners with TEXTONE Moldings matching specified panel finishes and installed according to manufacturer's directions.

3.3 resilient attachment systems

3.3.1 resilient channel erection

Position resilient channels at right angles to wood framing, space (16") (24") o.c. and attach to supports with $1\frac{1}{4}$ " type W, $1\frac{1}{4}$ " type S or 1" type S screws driven through holes in channel mounting flange.

On walls, attach $\frac{1}{2}$ " x 3" wide continuous filler strips to bottom plate. Install channels with mounting flange down, top channel

max. 6" down from ceiling, bottom channel 24" up from floor. Extend channels into all corners and attach to corner framing. Position channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6". For double layer system, attach channel through base layer to framing with $1\frac{1}{8}$ " type S screws.

Splice channel by nesting directly over framing member; screw-attach through both flanges. Reinforce with screws located at both ends of splice.

Where cabinets are to be installed, attach RC-1 Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at midpoint between hangers.

3.3.2 gypsum panel erection—walls

Apply gypsum panels of maximum practical length with long dimension parallel to resilient channel and fastened with 1" type S screws spaced 12" o.c. along channels. Center horizontal abutting edges over screw flange of channel. Where channel resiliency makes screw placement difficult, the next longer screw may be used but do not drive screw directly over stud. For direct attachment, fasten panels to wood studs with 6d nails 8" o.c.

For two-layer application of gypsum panels, apply base layer vertically and attach to resilient channels with 1" type S screws spaced 24" o.c. and to wood studs with $1\frac{1}{4}$ " type W screws 12" o.c. Apply face layer with long dimension at right angles to long edges of base layer and fasten with $1\frac{1}{16}$ " type S screws spaced 16" o.c.

3.3.3 gypsum panel erection—double-layer ceilings

For fire-rated assembly, apply gypsum base-layer panels with long edges across joists and end joints staggered. Fasten panels to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with $1\frac{1}{8}$ " type S screws.

Apply face-layer panels of maximum practical length with long dimension at right angles to resilient channels and end joints staggered. End joints may occur over resilient channels or midway between channels with joint floated and back-blocked. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" type S screws spaced 12" o.c. in field of panels and along abutting ends. Cut panels neatly and provide support around cutouts and openings.

3.4 area separation wall system

3.4.1 cavity wall

a. Foundation—Position 2 $\frac{1}{2}$ "-wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. When specified, caulk runner at foundation with $\frac{1}{4}$ " bead of USG Acoustical Sealant.

b. First floor—Install 1" liner panels and steel studs cut to length 3" more than floor-to-floor height. Erect liner panels vertically in J-runner with long edges in groove of T-stud. Install T-studs between panels and cap ends of run with E-stud. Fasten all studs at bottom to J-runner flange with $\frac{3}{8}$ " type S screws.

c. Intermediate floors—Cap top of panels and studs with J-runner and fasten studs to one J-runner flange with $\frac{3}{8}$ " type S screws. Install bottom J-runner for next row of panels over top runner with end joints staggered at least 12". Fasten runners together with double $\frac{3}{8}$ " screws at ends and spaced 24" o.c. Secure each stud to framing with 16-ga. aluminum angle clip, fastened to studs with $\frac{3}{8}$ " screws and to framing or subfloor with $1\frac{1}{4}$ " type W screws.

d. Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten studs to one flange with $\frac{3}{8}$ " screws. Fasten studs to framing with aluminum clips. Where flat gypsum concrete roof decks are used, secure top of fire barrier assembly to framing with a continuous 20-ga. hot-dipped galvanized steel strip, screw-attached to J-runner and framing.

e. Sound attenuation blankets—Install blankets between studs and attach to liner panel with five 9/16" staples driven through each blanket, one in center and others spaced 3" from each corner. Butt ends of blankets closely and fill all voids.

f. Resilient channels—When specified, install RC-1 Resilient Channels horizontally to box side of studs, 6" above floor, 6" below

ceiling joists and max. 24" o.c. Attach channels to studs with $\frac{3}{8}$ " type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

g. Gypsum panels—Apply $\frac{5}{8}$ " SHEETROCK W/R FIRECODE "C" gypsum panels vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" type S screws spaced 12" o.c. in field and 8" o.c. along vertical abutting edges and runner flanges. Stagger screws on abutting edges.

h. Resilient single-layer—Apply $\frac{5}{8}$ " gypsum panels vertically to resilient channels and fasten with $1\frac{1}{4}$ " type S screws placed 6" away from stud and 12" o.c. Do not place screws directly over stud.

i. Resilient double-layer—Apply $\frac{5}{8}$ " gypsum panel base layer horizontally to resilient channels with end joints staggered; fasten with $1\frac{1}{4}$ " type S screws placed 6" away from stud and 12" o.c. Apply $\frac{5}{8}$ " gypsum panel face layer vertically over base layer and attach with $\frac{1}{2}$ " type S screws spaced 12" o.c. and staggered from those in base layer.

3.4.2 solid wall

a. Foundation—Position 2" wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. When specified, caulk runner at foundation with $\frac{1}{4}$ " bead of acoustical sealant.

b. First floor—Install liner panels and H-studs to convenient length more than floor-to-floor height. Install two thicknesses of 1" liner panels vertically in J-runner with long edges in H-stud. Erect H-studs and double-thickness panels alternately until wall is completed. Cap ends of run with C-channel. Fasten all studs to J-runner flange with $\frac{3}{8}$ " type S screws.

c. Intermediate floors—Cap top of panels and studs with back-to-back J-runners screw-attached together with double $\frac{3}{8}$ " type S screws at ends and spaced 24" o.c. Fasten studs to runner flange with $\frac{3}{8}$ " screws. Secure studs to framing with 16-ga. aluminum angle clips screw-attached to studs and framing. Except at foundation, install fire blocking between joists and fire barrier.

d. Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten stud to one flange with $\frac{3}{8}$ " screws. Fasten studs to framing with aluminum clips. Where flat gypsum concrete roof decks or short parapet walls are used, secure top of fire barrier assembly to framing with a continuous 20-ga. hot-dipped galvanized steel strip screw-attached to J-runner and nailed to framing.

e. Interior finish—Apply single-layer $\frac{5}{8}$ " SHEETROCK SW FIRECODE "C" Gypsum Panels to wood studs and joists with screws or nails in conventional manner.

3.5 wall furring systems

3.5.1 single-layer application—direct attachment

Space suitable wood furring strips 16" o.c. and attach to masonry walls. Apply gypsum panels of maximum practical length with long dimension at right angles to furring strips. Fasten panels with $1\frac{1}{4}$ " type W screws spaced 12" o.c. Apply foil-back panels with foil side against furring. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between furring strips and wall.

3.5.2 single-layer application—resilient attachment

Position resilient channels horizontally and attach with 2" cut nails in mortar joints or brick, clay tile or concrete block or in field of lightweight aggregate block; $\frac{5}{8}$ " concrete stub nails or power-driven fasteners in monolithic concrete. Space fasteners 24" o.c. Position channels within 4" of floor and ceiling line and not more than 24" o.c.

Apply gypsum panels of maximum practical length with long dimension parallel to resilient channels. Fasten panels with 1" type S screws spaced 12" o.c. Center horizontal abutting edges over screw flange of channel. Apply foil-back panels with foil side against channels. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between resilient channels and wall.

3.6 exterior ceilings and soffits

Apply USG Exterior Gypsum Ceiling Board (horizontally) (vertically) with end joints over supports and with $\frac{1}{16}$ " to $\frac{1}{8}$ " space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12" o.c. or nails spaced 8" o.c. Where specified, cover joints with wood battens securely fastened to framing. Finish joints, trim and fasteners with exterior joint system applied according to manufacturer's directions.

3.7 underlayment application

Plywood subfloor must be sound, securely attached to framing, free of surface irregularities, and cleared of foreign material. Install PYROROCK Sound Underlayment Boards with long dimension perpendicular to joists. Locate all end joints over joists, staggered with adjacent end joints and with joints in subfloor. Fasten boards with $1\frac{1}{4}$ " type W screws or 6d ring-shank nails spaced 16" o.c. along each joist and around board cutouts. Drive fasteners flush with or below board surface. Except for carpet and pad or wood parquet flooring, fill all joints, fastener dimples and minor surface defects with DURABOND 90 Joint Compound. Seal entire room perimeter and all penetrations of underlayment with min. $\frac{1}{4}$ " bead of USG Acoustical Sealant along board edge.

3.8 accessory application

a. Joint System—Finish all face panel joints and internal angles with a U.S.G. Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with $\frac{5}{16}$ " rosin-coated staples 9" o.c. on both flanges along entire length of bead.

c. Metal Trim—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with screws or staples 12" o.c.

d. P-1 Vinyl Trim—Slip trim over gypsum panel edge with long flange behind panel. Install panel with trim firmly abutting surface.

e. Screws—Power-drive at least $\frac{3}{8}$ " from edges or ends of gypsum panels to provide uniform dimple $\frac{1}{32}$ " deep.

f. Control Joints—Break gypsum panels and resilient channels behind joint and back by double supports. Attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

description and utility

There is only one SHEETROCK—the interior wall and ceiling surface developed and improved by United States Gypsum. It is the product that in the last quarter-century, has revolutionized construction—to the point that today more than 90% of all new residential buildings are finished with gypsum panels. Systems using SHEETROCK Gypsum Panels now have gained the same acceptance in commercial building.

SHEETROCK is a mill-fabricated gypsum panel composed of a fireproof gypsum core encased in a heavy manila-finished paper on the face side and a strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth. In SHEETROCK SW Gypsum Panels, an exclusive edge design strengthens the joint and reduces imperfections in finishing.

Gypsum panels are produced in specialized forms for various applications. Complementing these is the industry's broadest line of accessories, adhesives and joint treatment materials to provide complete partition, ceiling and floor assemblies. This catalog covers these products in five groups: (1) Gypsum Panel Products; (2) Trim Accessories; (3) Structural Accessories; (4) Screws and Adhesives; (5) Joint Treatment Products. A general specification appears on pages 10 to 12; performance and specification of assemblies using these components are covered in pertinent U.S.G. System Folders.

Interior walls and ceilings built with SHEETROCK gain a durable surface suitable for any type of decorative treatment and for repeated decoration during the life of the building. The joints between adjacent panels may be reinforced and concealed with a U.S.G. joint treatment system, or may be featured by leaving exposed or covering with a decorative molding.

Dry Construction—mill-fabricated gypsum panels eliminate excessive moisture in construction.

Speed—Panels are easily cut and quickly applied.

Quick Decoration—essentially a "dry" material, SHEETROCK Panels permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire Protection—the gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F. until completely calcined—a slow process. See U.S.G. Construction Selector SA-100 for fire-resistance ratings.

Crack Resistance—with joints reinforced by one of the U.S.G. joint systems, SHEETROCK SW Gypsum Panels form walls and ceilings exceptionally resistant to cracks caused by frame movement, vibration or minor settlement.

Non-Warping—expansion or contraction under normal atmospheric changes is negligible and does not cause harmful warping or buckling.

Availability—24 strategically located U.S.G. operating plants produce and/or stock the gypsum panel materials described here. Special distribution centers, in addition to these plants, increase total service efficiency to major markets and rural areas from coast to coast. All standard or specialty gypsum panel products may be considered readily available and easily procured upon short notice.

general limitations

1. Not recommended where exposure to moisture is extreme or continuous.
2. Must be adequately protected against wetting when used as a base for ceramic or other wall tile (see Foil-Back SHEETROCK limitation). SHEETROCK W/R Gypsum Panels are the recommended product for this purpose in partitions.



3. Maximum spacing of framing members: $\frac{1}{2}$ " and $\frac{5}{8}$ " SHEETROCK Gypsum Panels are designed for use on framing centers from 16" to 24"; $\frac{3}{8}$ " and $\frac{1}{4}$ " SHEETROCK, on centers up to 16". In both walls and ceilings, when $\frac{1}{2}$ " or $\frac{5}{8}$ " SHEETROCK Panels are applied across framing on 24" centers and joints reinforced, headers are not required. $\frac{3}{8}$ " and $\frac{1}{4}$ " SHEETROCK not recommended for use on metal framing.

4. Application of SHEETROCK over $\frac{3}{4}$ " wood furring applied across framing is not recommended since the relative flexibility of the furring under impact of the hammer tends to loosen nails already driven. Furring should be 2" x 2" minimum (may be nom. 1" x 4" if panels are to be screw-attached).

5. The application of SHEETROCK over an insulating blanket, that has first been installed continuously across the face of the framing members, is not recommended. Blankets should be recessed and the blanket flanges attached to sides of studs or joists.

technical data

SHEETROCK Gypsum Panels comply with Federal Specification SS-L-30D; ASTM C36. Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40° — 100° F); hygrometric coefficient of expansion (unrestrained): 5.4×10^{-6} in. per in. per % r.h. (5%—90% r.h.). Fire hazard classification: flame spread 15, fuel contributed 15, smoke developed 0.

†Recommended as a base for ceramic or other tile.

WALLS											
Construction (thickness) → $\frac{1}{4} "$ $\frac{3}{8} "$ $\frac{1}{2} "$ $\frac{5}{8} "$ $\frac{3}{4} "$ $\frac{1}{2} "$ $\frac{5}{8} "$ $\frac{3}{4} ", \frac{1}{2} ", \frac{5}{8} "$ $\frac{1}{2} ", \frac{5}{8} "$ $\frac{3}{4} ", \frac{1}{2} ", \frac{5}{8} "$ $\frac{1}{2} ", \frac{5}{8} "$											
(Type) →	Reg-Ular	SW and Regular	FIRECODE	ULTRAL-BACK	R.H.	TEXTONE Base	Vinyl Panels	W.R.	Panels	Walls	over channel or nailable grille
X	X	X	X	X	X	X	X	X	X	X	Exterior Walls-Single Layer masonry (turred)
X	X	X	X	X	X	X	X	X	X	X	Exterior Walls-Double Layer masonry (turred)
X	X	X	X	X	X	X	X	X	X	X	Interior Walls-Single Layer masonry (turred)
X	X	X	X	X	X	X	X	X	X	X	Interior Walls-Double Layer masonry (turred)
X	X	X	X	X	X	X	X	X	X	X	Interior Walls-Single Layer masonry (turred)
X	X	X	X	X	X	X	X	X	X	X	Interior Walls-Double Layer masonry (turred)
X	X	X	X	X	X	X	X	X	X	X	Cellings-Single Layer wood framing
X	X	X	X	X	X	X	X	X	X	X	Cellings-Single Layer metal framing
X	X	X	X	X	X	X	X	X	X	X	Cellings-Double Layer wood framing
X	X	X	X	X	X	X	X	X	X	X	Cellings-Double Layer base finish
X	X	X	X	X	X	X	X	X	X	X	Cellings-Acoustical Base over suspended metal grille
X	X	X	X	X	X	X	X	X	X	X	Cellings-Acoustical Base over channel or nailable steel studs

Where to use **SHEETROCK** Gypsum Panels

SHEETROCK SW GYPSUM PANELS are United States gypsum's revolutionary development to minimize ridging or beading at joints—so effective that it's patented under U.S. Pat. No. 3,433,582. This exclusive edge design helps to combat moisture damage during framing, offset joints, poor framing alignment, damaged board edges, and extremes of temperature and humidity during construction. One of drywall's foremost advantages in 40 years, the **SHEETROCK SW GYPSUM PANEL** system produces the strongest joint ever developed.

1. Gypsum Panel Products

types and functions

1. Gypsum Panel Products

SHEETROCK SW Gypsum Panels are United States Gypsum's revolutionary development to minimize ridging or beading at joints—so effective that it's patented under U.S. Pat. No. 3,435,582. Its exclusive edge design helps to compensate for twisted framing, offset joints, poor framing alignment, damaged board edges, and extremes of temperature and humidity during construction. One of drywall's foremost advances in 40 years, the SHEETROCK SW Gypsum Panel system produces the strongest joint ever developed.

This is accomplished by pre-filling gypsum panel joints with DURABOND 90 Joint Compound, a formulation which chemically hardens in about 1½ hours, providing maximum bond and minimum shrinkage. The edge contour eliminates the need to crown joints, and no more compound is required than with regular panels. Taping and other application procedures are conventional.

SHEETROCK Regular Gypsum Panels have a tapered edge, but otherwise are identical to SW Panels. Both types are made in three thicknesses:

— $\frac{1}{4}$ ", recommended for the finest single layer drywall construction. The greater thickness provides increased resistance to fire exposure and transmission of sound.

— $\frac{1}{2}$ ", for single layer application in residential construction.

— $\frac{3}{8}$ ", lightweight, applied principally in the double wall system over wood framing and in repair and remodel work.

Regular Panels are available in one additional thickness:

— $\frac{1}{4}$ ", a lightweight, low-cost, utility gypsum panel, used as base layer for improving sound control in double-layer metal and wood stud partitions and for use over old wall and ceiling surfaces.

Width: 4'; length: 8', 9', 10', 12' or 14' (except $\frac{1}{4}$ ", available in 8' and 10' lengths only); edges: SW or tapered; finish: ivory manila paper, suitable for paint or other decoration.

Where to use SHEETROCK Gypsum Panels

(type)→	Reg- ular	SW and Regular		FIRECODE		Foil-Back			R.H. Base	TEXTONE Vinyl Panels	W/R. Panels†	
construction	(thickness)→	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ " & $\frac{5}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{1}{2}$ " & $\frac{5}{8}$ "	$\frac{3}{8}$ ", $\frac{1}{2}$ " or $\frac{5}{8}$ "	$\frac{1}{2}$ " & $\frac{5}{8}$ "
WALLS												
Exterior Walls—Single Layer				X	X	X		X	X			X
masonry (furred)				X	X	X		X	X			X
wood framing				X								X
rigid insulation board												X
Exterior Walls—Double Layer				X	X	X	X	X	X		X	
masonry (furred)				X	X	X	X	X	X			X
base				X	X	X	X	X	X			X
finish				X	X	X	X	X	X			X
wood framing				X	X	X	X	X	X			X
base				X	X	X	X	X	X			X
finish				X	X	X	X	X	X			X
Interior Walls—Single Layer				X	X	X	X	X	X		X	
over existing walls				X	X	X	X	X	X			X
masonry (furred)				X	X	X	X	X	X			X
wood framing				X	X	X	X	X	X			X
metal framing				X	X	X	X	X	X			X
masonry & concrete (direct)				X	X	X	X	X	X			X
Interior Walls—Double Layer				X	X	X	X	X	X		X	
masonry (furred)				X	X	X	X	X	X			X
base				X	X	X	X	X	X			X
finish				X	X	X	X	X	X			X
wood framing				X	X	X	X	X	X			X
base				X	X	X	X	X	X			X
finish				X	X	X	X	X	X			X
metal framing				X	X	X	X	X	X			X
base				X	X	X	X	X	X			X
finish				X	X	X	X	X	X			X
CEILINGS												
Ceilings—Single Layer	X	X	X	X	X	X	X	X	X	X		
over existing ceiling	X	X	X	X	X	X	X	X	X	X		
wood framing												
metal framing												
Ceilings—Double Layer				X	X	X	X	X	X			
wood framing				X	X	X	X	X	X			
base				X	X	X	X	X	X			
finish				X	X	X	X	X	X			
metal framing				X	X	X	X	X	X			
base				X	X	X	X	X	X			
finish				X	X	X	X	X	X			
Ceilings—Acoustical Base				X	X	X						
over suspended metal grillage				X	X	X						
over channel or nailable steel studs				X	X	X						

†Recommended as a base for ceramic or other tile.



Pre-filling joints of SHEETROCK SW Gypsum Panels

SHEETROCK FIRECODE Gypsum Panels, made in $\frac{5}{8}$ " and $\frac{1}{2}$ " thicknesses, combine all the advantages of SHEETROCK with additional resistance to fire exposure—the result of a specially formulated core containing special mineral materials. Facings of special FIRECODE "C" Gypsum Panels have qualified for fire ratings of up to 2 hours in walls, 3 hours in ceilings, 4 hours for column protection previously obtained only with heavier assemblies. See U.S.G. Construction Selector for description of tested assemblies.

Limitations (also refer to General Limitations, page 1): (1) In order to attain fire-resistance ratings, the construction of the partition and/or floor and ceiling assemblies must conform to the panel designs as tested at the indicated fire testing facilities (see U.S.G. System Folders). (2) Maximum spacing of frame members: 24" c. to c.

Width: 4'; length: 8', 9', 10', 12' or 14'; edges: eased, tapered; finish: ivory manila paper, suitable for paint, wallpaper or other decoration.

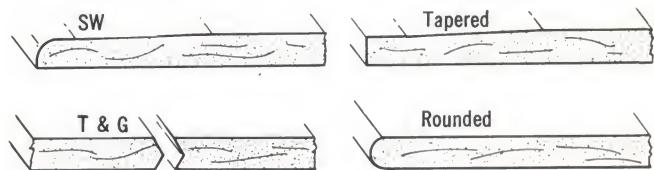
Foil-Back SHEETROCK is made by laminating special kraft-backed aluminum foil to back surface of regular or SHEETROCK SW panels. It is effective as a vapor barrier for exterior walls and ceilings when applied with foil surface next to the framing (1) in single-layer application, or (2) as the base layer in the double-layer system. A significant thermal insulating value is achieved when SHEETROCK is installed with the aluminum foil facing an air space of $\frac{3}{4}$ " minimum (for construction details, see U.S.G. Folder SA-923). The scuff-resistant metal foil reduces outward heat flow in winter, and inward heat flow in summer.

With Foil-Back SHEETROCK, the possibility of condensation within an exterior wall, and resulting exterior paint failures, is minimized. Meets ASTM requirements for a vapor permeability not exceeding 0.30 perm. **Limitation:** do not use as a base for ceramic or other tile. Thickness: $\frac{5}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ ". Sizes, edges and finish: same as SHEETROCK SW Panels.

SHEETROCK W/R Gypsum Panels are a proven water-resistant base for the adhesive application of ceramic and plastic tile and plastic-faced wall panels. Made water-resistant all the way through: (1) multi-layered face and back paper are chemically treated to combat penetration of moisture; (2) the gypsum core is made water-resistant with a special asphalt composition. The panel is easily recognized because of its distinctive green face.

In addition to their use as a superior tile base in new construction, SHEETROCK W/R Panels are a cost-saver in modernization work. They permit new tilework to be installed over existing surfaces without tearing out old walls providing a vapor barrier does not exist. **Limitations:** adherence to recom-

Gypsum Panel Products—Types of Edges



Gypsum Panel Application and Frame Spacing

thickness	approx. weight psf.	location	application method	max. frame spacing c. to c.
$\frac{5}{8}$ " (1)	1.5	ceilings	horizontal	16"
$\frac{5}{8}$ " (1)	1.5	sidewalls	horizontal or vertical	16"
$\frac{1}{2}$ "	1.9	ceilings	vertical horizontal	16" 24"
$\frac{1}{2}$ "	1.9	sidewalls	horizontal or vertical	24"
$\frac{5}{8}$ "	2.4	ceilings	vertical horizontal	16" 24"
$\frac{5}{8}$ "	2.4	sidewalls	horizontal or vertical	24"

(1) For wood framing only

Bending of SHEETROCK Gypsum Panels

SHEETROCK thickness	bending radii with dry SHEETROCK	
	lengthwise	width
$\frac{1}{2}$ "	20' (1)	—
$\frac{5}{8}$ "	7½'	25'
$\frac{5}{8}$ "	5'	15'

(1) Bending two $\frac{1}{4}$ " pieces successively permits radii shown for $\frac{1}{4}$ " SHEETROCK.

NOTE: By moistening the face and back paper thoroughly prior to application, and replacing in the stack for at least one hour, the panel may be bent to still shorter radii. When the panel dries thoroughly, it will regain its original hardness.

mendations concerning sealing exposed edges, painting, tile adhesives, framing and installation is necessary for satisfactory performance (see Folder SA-924). Not recommended for application on ceilings.

Available in plain core, $\frac{1}{2}$ " and $\frac{5}{8}$ " thickness; also in $\frac{5}{8}$ " SHEETROCK W/R FIRECODE "C" Gypsum Panels for applications where a 1-hour fire rating is desired—listed under UL Label Service R-1319-84 with following design numbers applicable: 45-min. U317; 1-hr. U305; 2-hr. U301, U411. Comply with ASTM C630. Width: 4'; length: 8', 10' or 12'; edges: tapered; finish: green treated manila paper, suitable for receiving tile, paint or wallpaper.

TEXTONE Panels are conventional gypsum panels with factory-applied vinyl facings in a wide range of coordinated decorator colors. The panels are used for predecorated permanent partitions, movable partitions or in remodeling. See U.S.G. Folder SA-928 for descriptions and specifications.

USG Coreboard has a 1" thick fireproof gypsum core encased in strong, gray liner paper on both sides. It is used in vent shaft and laminated gypsum partitions with additional layers of gypsum panels applied to the coreboard to complete the wall assembly. Manufactured with "V" T&G edges for use in solid partitions or with square edges and prescored 6" to 8" o.c. Coreboard strips are then easily snapped and separated from this master unit. Thickness: 1"; width: 24"; edges: "V" T & G or square; length: 8', 9', 10' and 12' (prescored—7'-8" lengths only); finish: gray paper, unsuitable as exposed surface.

USG Laminated Gypsum Coreboard has a fireproof gypsum core encased in strong gray liner paper on both sides. Panels are factory-laminated, using mineral adhesive, for use in USG Solid Shaft Wall Partitions (see Folder SA-922). Available in 2" thickness with beveled edges made from two 1" coreboards in 16" and 24" widths, lengths up to 16 ft.

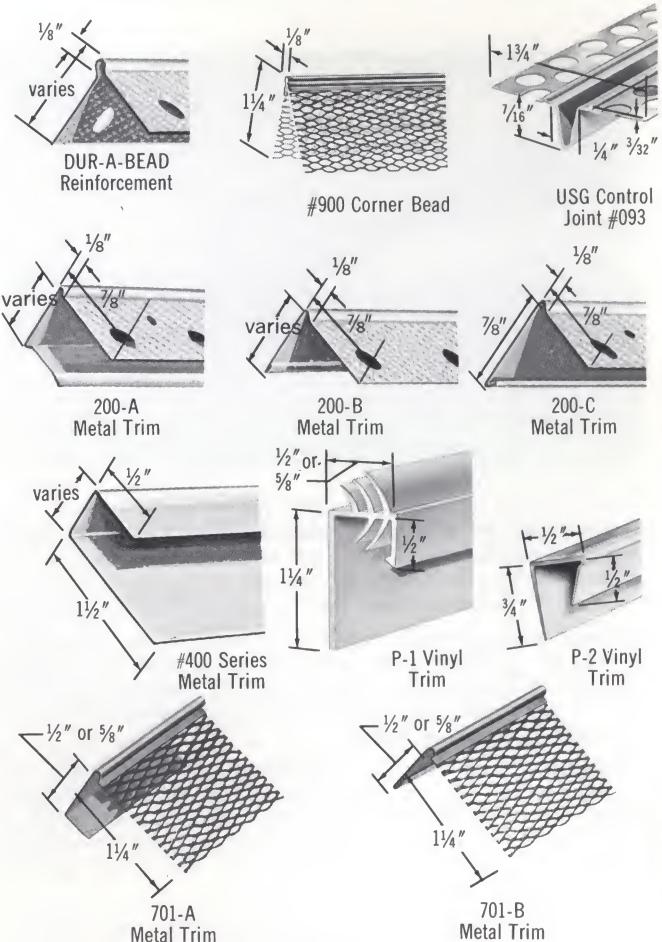
USG Shaft Wall Liner has a special gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Used in USG Cavity Shaft Wall Partitions (see Folder SA-922) and in Cavity-type Area Separation Walls (see Folder SA-924). Panels have beveled edges, are 1" thick, 16" and 24" wide and are available in lengths up to 16 ft.

PYROROCK Sound Underlayment Board is a high-strength gypsum product for lightweight, dry installation over interior plywood subfloors. Nailed or screw-attached, it offers a superior base for directly applied carpet and pad, vinyl tile or other durable floor covering. Qualifies for 1-hr. combustible fire rating—UL Design L523. When combined with a resiliently attached gypsum panel ceiling, the assembly meets HUD requirements for sound control in multi-family dwellings. Compared to wet systems, PYROROCK eliminates job delays for curing, reduces floor weight as much as 10 psf often reducing framing costs, and requires only a single plate at party walls. Thickness: $\frac{3}{4}$ "; width: 48"; edges: square; length: 6' and 8'; weight: 3.5 psf. **Limitation:** not recommended for bathrooms, laundry rooms or other locations where exposed to water.

USG R. H. Base is a specially fortified gypsum panel, used with SHEETROCK R.H. Filler in electric cable ceilings. Available 4' wide, regular $\frac{1}{2}$ " or $\frac{5}{8}$ " thick, FIRECODE $\frac{1}{2}$ " thick, 8 to 12-ft. lengths, edges rounded. Nailed or screw-applied to wood joists; screw-applied to USG metal furring channels or RC-1 resilient channels. The system (see U.S.G. Bulletin P-480) improves heat emission and resistance to heat deterioration. U. L. listed.

USG Exterior Gypsum Ceiling Board is a weather-resistant board designed for use on the soffit side of eaves, canopies and carports and other commercial and residential exterior applications with indirect exposure to the weather. It is noncombustible, is simply scored and snapped for quick application, and offers excellent paintability. Most important are its sag and water-resistance—which independent tests have shown superior to those of exterior grade plywood and structural laminated paper board. Fire hazard classification: flame spread 20, fuel contributed 5, smoke developed 0.

Installed conventionally in wood and metal-framed soffits; batten strips or moldings used over butt joints or joints treated; backing strips required for small vent openings. Has



USG Trim Accessories

brown back paper and beige, water-repellent face paper. Thickness: $\frac{1}{2}$ "; width: 4'; lengths: 8', 12'; edges: eased. Also available in $\frac{5}{8}$ " thick FIRECODE Exterior Ceiling Board with fire-rated core.

USG Sound Deadening Board is used as base layer under gypsum panels to reduce sound transmission in metal stud partitions (see Folder SA-923). Thickness: $\frac{1}{2}$ "; width: 48"; edges: square; lengths 8' and 9'; flame spread classification 5; ASTM noncombustible Class A rating.

THERMAFIBER Insulation is a mineral fiber product ideal for improving sound control in partition and floor/ceiling constructions. **Insulating Blankets**, kraft paper enclosed, are used in wood frame construction. **M-S Blankets** are designed for insulating exterior furring and metal stud curtain wall assemblies. They are flangeless, open-faced on breather side and require separate vapor barrier. **Sound Attenuation Blankets** are a paperless, semi-rigid mineral fiber mat designed to improve STC ratings when installed within U.S.G. metal stud and gypsum tile partitions (see Folder SA-705).

USG Gypsum Sheathing is a fireproof gypsum board, $\frac{1}{2}$ " thick, with an asphalted gypsum core encased in specially formulated brown water-repellent paper on both sides and long edges. Its weather resistance, water repellence, fire resistance and low applied cost make it suitable for use in exterior curtain wall construction (see Folder SA-805); also a popular choice for wood-framed garden apartments and light commercial buildings. Available in two types: 24" wide, 8' lengths, with V-shaped T&G long edges, and 48" wide, 8 and 9' length, with square edges.



USG Exterior Gypsum Ceiling Board

2. USG Trim Accessories

DUR-A-BEAD is an all-metal heavy gauge hot-dipped galvanized steel reinforcement for protecting external corners. It is nailed to framing through gypsum panels and concealed with U.S.G. joint compounds as a smooth, finished corner. Available in three flange widths: No. 101 1"x1"; No. 103 1 1/4"x1 1/4"; No. 104 1 1/8"x1 1/8".

No. 900 Corner Bead is a galvanized steel external corner reinforcement with 1 1/4" wide fine-mesh expanded flanges. Nailed or stapled to framing through panels; provides superior key for joint compounds and eliminates shadowing.

USG Control Joint No. 093 is used to relieve stresses of expansion and contraction across the joint in large ceiling and wall areas. Used from floor to ceiling in long partition runs, and from door header to ceiling. Made from roll-formed zinc with a tape-protected 1/4" opening 7/16" deep. Lengths: 8' and 10'. **Limitation:** where sound and/or fire ratings are prime considerations, an adequate seal must be provided behind the control joint.

USG Trims provide maximum protection and neat finished edges to gypsum panels at window and door jambs, at ceiling angles and at intersections where panels abut other materials. Easily installed by nailing through the channel and panels into the framing or jamb. Eliminate precision cutting and mitering; joints are simply butted together. Finished with U.S.G. joint compounds (except P-1, P-2, #400 and RP series). Made in following types and sizes:

#200 series—steel casing, includes No. 200-A U-shaped channel in 1/2" and 5/8" sizes; No. 200-B L-shaped angle edge trim without back flange to simplify application, in 1/2" and 5/8" sizes; No. 200-C L-shaped trim, requires slotted jamb for installation in most cases, open "V" edge of flange inserts into 1/8" kerf to make trim adjustable for use with 3/8", 1/2" and 5/8" gypsum panels.

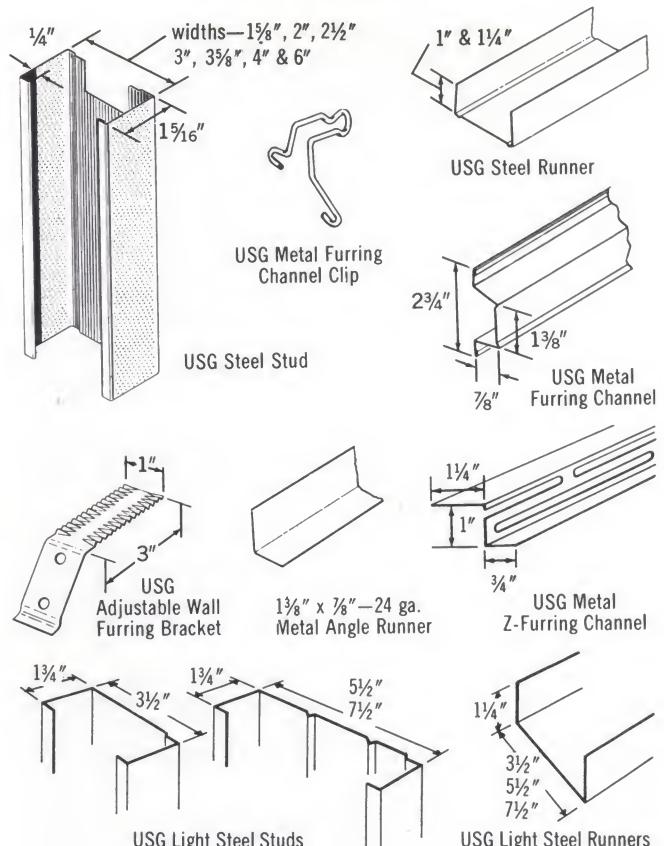
#400 series—reveal type all-metal trim, requires no finishing compound, includes No. 400 in 3/8" size, No. 401 in 1/2" size, No. 402 in 5/8" size.

#700 series—all-metal trim with expanded flanges used to provide edge protection at cased openings and ceilings or wall intersections. Includes 701-A channel-type and 701-B L-shaped trim, both in 1/2" and 5/8" sizes.

USG P-1 Vinyl Trim is a reveal type, white plastic trim with flanges and web of rigid vinyl and integral flexible vinyl fins that compress on installation. Fins form permanent flexible seal to effectively block sound, replace caulking, provide structural stress relief at panel perimeter. Fits tightly over panel edge; requires no finishing compound; paints easily; includes P-1A in 1/2" size, P-1B in 5/8" size.

USG P-2 Vinyl Trim is a channel-shaped vinyl trim with a pressure-sensitive adhesive backing for attachment to the wall at wall-ceiling intersections. Provides positive perimeter relief in radiant heat ceiling systems. Length: 10'.

USG Rigid Vinyl Trim (RP Series) is precision-made of rigid vinyl plastic in solid colors: ivory, tan, chocolate and black. Available for 3/8", 1/2" and 5/8" thick panels; lengths: 8', 9', 10'; shapes: RP-1 Outside Corner, RP-2 Inside Corner, RP-3 Divider, RP-4 End Cap, RP-5 Snap-on Corner, RP-7 Snap-on Batten.



USG Structural Accessories

3. Structural Accessories

USG Standard Steel Studs are non-load bearing channel-type studs formed from galvanized steel, designed for screw attachment of 1/2" and 5/8" SHEETROCK Gypsum Panels in USG steel stud partitions and column fireproofing and as framing in drywall ceilings (see Folder SA-923). One end of each stud is notched (except in the 1 5/8" stud), and knockouts are located 12" from each end to facilitate pipe and conduit installation—also available with keyhole cutouts in selected markets. Made in seven widths, 8' to 16' lengths. Comply with ASTM C645. For structural properties, see Folder SA-923.

USG Steel Runners are galvanized steel sections designed to secure various types of U.S.G. partitions to floor and ceiling. Channel-type runners available in seven widths: 1 5/8", 2", 2 1/2", 3", 3 5/8", 4", 6", and with unhemmed 1" or 1 1/4" legs—all used with the USG Steel Stud Partition; L-shaped runners 7/8"x1 1/8", used with laminated gypsum partitions. Lengths: 10' and 12'.

USG 20-ga. Steel Studs and Runners are strong non-load bearing components of U.S.G. exterior curtain wall systems. Gypsum sheathing on the outside, gypsum drywall or plaster base on the inside are screw-attached to the channel-type studs, which are roll-formed from galvanized steel. Studs are screw-attached to runners at top and bottom. Also suitable for interior partitions where greater heights are needed. Studs and runners are available in six widths—2", 2 1/2", 3", 3 5/8", 4" and 6"—stud in lengths up to 28'; runners (designed with 1" unhemmed leg) in 10' and 12' lengths. For properties and limiting

heights in exterior curtain walls, see U.S.G. Folder SA-805; for interior partition applications, see Folder SA-923.

Products listed above comply with Federal Specifications QQS-698 and QQS-775d, Class d.

USG Light Steel Studs and Runners are non-load bearing channel-type framing members used in U.S.G. curtain wall systems where greater limiting heights are required. Available in $3\frac{1}{2}$ ", $5\frac{1}{2}$ " and $7\frac{1}{2}$ " widths, roll-formed from high-yield-strength, hot-dipped galvanized steel. Studs $5\frac{1}{2}$ " and $7\frac{1}{2}$ " wide have intermediate ribs which add resistance to lateral loading. Stud web has $1\frac{1}{4}$ " round holes 24" o.c. for electrical and piping installation. Studs available in 12 styles in lengths up to 32'; runners in 3 styles ($1\frac{1}{4}$ " unhemmed leg) in 10' lengths. For properties and limiting heights, see U.S.G. Folder SA-805.

USG Metal Furring Channels are ceiling and wall channels made of galvanized steel designed for attachment of $\frac{1}{2}$ " and $\frac{5}{8}$ " SHEETROCK with USG Brand Type S Screws. Face width: $1\frac{3}{8}$ "; depth: $\frac{1}{8}$ "; length: 12'.

USG Furring Channel Clips are made of galvanized wire and used in attaching Metal Furring Channels to $1\frac{1}{2}$ " cold-rolled runner channels. They are installed on alternate sides of the carrying channels; where clips cannot be alternated, wire tying is recommended.

USG Z-Furring Channels are used to mechanically attach rigid insulation board or Z-furring blankets and SHEETROCK Gypsum Panels to monolithic concrete and masonry walls (see U.S.G. Folder SA-923). Made of hot-dipped galvanized steel; furring depth: 1"; length: 8'-6".

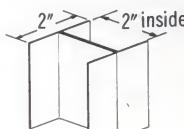
USG Adjustable Wall Furring Brackets are used for attaching $\frac{3}{4}$ " furring channels to exterior masonry walls. Made of 20-ga. galvanized steel with corrugated edges, they are wire-tied to horizontal stiffeners, 24" o.c., in braced furring systems: fur out board $\frac{1}{4}$ " to $2\frac{1}{4}$ " plus channel depth.

USG Cold-Rolled Channels, made of 16-ga. steel, are used for furring, and in suspended ceilings and partition construction. Available either galvanized or black asphaltum painted. Sizes: $\frac{3}{4}$ ", with $\frac{1}{2}$ " flange; $1\frac{1}{2}$ ", with $19\frac{1}{32}$ " flange; 2", with $1\frac{1}{8}$ " flange. Lengths: 16' and 20'.

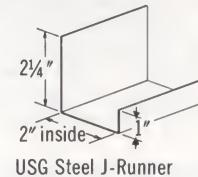
RC-1 SHEETROCK Resilient Channel is a galvanized steel channel which provides for resilient attachment of gypsum panels to wood framing. Widely used to improve sound transmission loss in partitions and ceilings of garden-type apartments, motels and other structures (see U.S.G. Construction Selector). Pre-punched holes in the flange facilitate screw fastening to framing members; SHEETROCK is attached to channel with USG Brand Type S Screws. Width: $2\frac{5}{8}$ "; depth: $\frac{1}{2}$ "; length: 12'. **Limitation:** not for use beneath highly flexible floor joists; should be attached to ceilings only with $1\frac{1}{4}$ " USG Brand Type W or S Screws; see Wood Framing Requirements, page 10.

Note: Refer to Notes to Architect, page 10, for recommendations concerning use and storage of light-gauge metal components in Coastal and other areas where corrosive elements are present in the atmosphere.

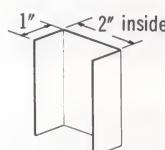
Steel Components for Shaft Walls and Area Separation Walls



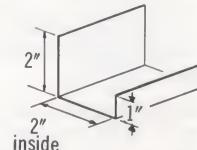
USG Steel H-Stud



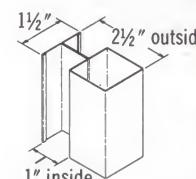
USG Steel J-Runner



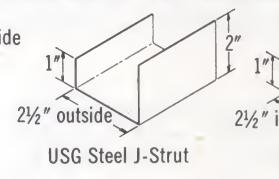
USG Steel C-Channel



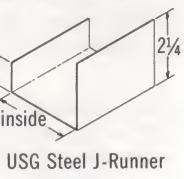
USG Steel J-Strut



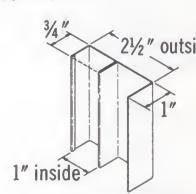
USG Steel T-Stud



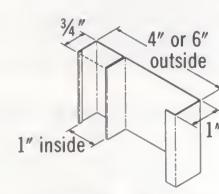
USG Steel J-Strut



USG Steel J-Runner



USG Steel E-Stud



USG Steel E-Stud

USG Cavity Wall Systems

USG Steel Components for Shaft Walls and Area Separation Walls are formed from hot-dipped galvanized steel meeting ASTM A446-67, Grade A with $1\frac{1}{4}$ oz. per sq. ft. zinc coating (see U.S.G. Folders SA-922 and SA-924). Items are color-coded at factory to indicate material gauge as follows: 25-ga. white; 24-ga. green; 22-ga. blue; 20-ga. red; 18-ga. yellow; 16-ga. black. Two groups:

Solid Wall Components are made for use with 2" thick laminated coreboard. USG Steel J-Runners, used as floor and ceiling runners and for duct and pipe framing, are made with unequal legs. Size: $1''x2''x2\frac{1}{4}$ "; gauge: 24, 20 and 16; length: 10'. USG Steel H-Studs slide over and engage edges of adjacent coreboard panels. Size: $2''x2''$ in 24, 22, 20, 18 and 16-ga.; length: 8' to 16'. USG Steel C-Channels are used as capping over coreboard panels at intersections, door jambs, column and both sides of closure panels. Size: $1''x2''$; gauge and length same as for H-Studs. USG Steel J-Struts are used for door headers or access panels. Size: $1''x2''$; gauge: 24, 20 and 16; length: 10'.

Cavity Wall Components are made from galvanized steel for use with 1" thick USG Shaft Wall Liner. USG Steel J-Runners made with unequal legs in $2\frac{1}{2}$ ", 4" and 6" widths; gauge: 24 and 20; length: 10'. USG Steel T-Studs are rigid roll-formed box-T sections specially shaped to engage 1" liner panels. Size: $2\frac{1}{2}''x1\frac{1}{2}$ "; length: 25-ga. 8' to 16'-9", 20-ga. 8' to 18'. USG Steel E-Studs are used singly to cap partition or back-to-back for special height requirements. Size: $1''x2\frac{1}{2}$ ", 4" or $6''x\frac{3}{4}$ "; gauge: 25 and 20; length: 8' to 28'. USG Steel J-Struts are used for framing openings. Size: $1''x2\frac{1}{2}''x2''$; gauge: 24 and 20; length: 10'.



RC-1 Resilient Channel

SHEETROCK Gypsum Panels & Accessories

4. USG Screws, Adhesives and Sealants

USG Brand Screws are aimed at producing the best possible attachment of SHEETROCK Gypsum Panels. Their development not only has improved installation methods but has made possible today's broad selection of drywall systems applied over metal framing. Screws must be used with such systems, with the exception of $\frac{3}{8}$ " panels applied to steel nailing channels, where annular ring nails may be used.

The superior holding power of drywall screws has virtually eliminated loose panel attachment and consequent problems of "nail pops" in wood frame construction. Fewer screws

than nails are generally required, and speed of installation compares favorably with nailing when electric screw guns are used. Fracturing of the gypsum core and damage to face paper are minimized. Tests have shown USG Brand Screws to have 100% greater withdrawal resistance than GWB-54 nails.

Today's complete U.S.G. line of 27 self-drilling, self-tapping steel screws includes types with a double lead thread design which produces up to 30% faster penetration, less screw stripping, and greater holding power than conventional fasteners. Comply with ASTM C646.

For nail recommendations, see U.S.G. Drywall Construction Handbook WB-52.

Selector Guide For USG Brand Screws

Fastening Application	Fastener Used	Fastening Application	Fastener Used
GYPSUM PANELS TO STANDARD METAL FRAMING (1)			
$\frac{1}{2}$ " single layer panels to standard studs, runners, channels	$\frac{1}{8}$ " Type S Bugle Head	Standard metal studs to door frames, runners	$\frac{3}{8}$ " Type S Pan Head Also available with hex washer head
$\frac{3}{8}$ " single layer panels to standard studs, runners, channels	1" Type S Bugle Head	Standard metal studs to door frame jamb anchor clips 20-ga. studs to runner Other metal-to-metal attachment (12-ga. max.)	1" Type S-12 Pan Head
$\frac{1}{2}$ " double layer panels to standard studs, runners, channels	$1\frac{1}{16}$ " Type S Bugle Head	Standard metal studs to door frame jamb anchor clips (heavier shank assures entry in clips of hard steel)	$\frac{1}{2}$ " Type S-12 Pan Head
$\frac{3}{8}$ " double layer panels to standard studs, runners, channels	$1\frac{1}{8}$ " Type S Bugle Head	Strut studs to door frame clips, rails, other attachments in ULTRAWALL movable partitions	$\frac{1}{2}$ " Type S-16 Pan Head Cadmium Plated
1" coreboard to metal angle runners in solid partitions	1 $\frac{1}{4}$ " Type S Bugle Head	TRIM AND ACCESSORIES TO METAL FRAMING	
$\frac{1}{2}$ " panels through coreboard to metal angle runners in solid partitions	1 $\frac{1}{8}$ " Type S Bugle Head	Door hinges and trim to door frame Aluminum trim to metal framing (screw matches hardware and trim)	$\frac{3}{8}$ " Finishing Screw Type S-18 Oval Head Cadmium Plated
$\frac{3}{8}$ " panels through coreboard to metal angle runners in solid partitions	2 $\frac{1}{8}$ " Type S Bugle Head	Cabinets to standard metal studs and resilient channels	1 $\frac{1}{4}$ " Type S Oval Head Also available in 1 $\frac{1}{8}$ " and 2 $\frac{1}{8}$ " length
GYPSUM PANELS TO 12-GA. (MAX.) METAL FRAMING			
$\frac{1}{2}$ " and $\frac{3}{8}$ " panels and gypsum sheathing to 20-ga. studs and runners	1" Type S-12 Bugle Head	Batten strips to standard metal studs in Demountable partitions	1 $\frac{1}{8}$ " Type S Bugle Head
USG Self-Furring Metal Lath through gypsum sheathing to 20-ga. studs and runners	1" Type S-12 Bugle Head	Aluminum trim to interior metal framing in Demountable and ULTRAWALL partitions	1 $\frac{1}{4}$ " Finishing Screw Type S Bugle Head Cadmium Plated
ULTRAWALL Panels to studs and runners	1 $\frac{1}{4}$ " Type S-12 Bugle Head	GYPSUM PANELS TO WOOD FRAMING	
$\frac{1}{2}$ " and $\frac{3}{8}$ " double layer gypsum panels to 20-ga. studs and runners	1 $\frac{1}{8}$ " Type S-12 Bugle Head	$\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ " single layer panels to wood framing	1 $\frac{1}{4}$ " Type W Bugle Head
Multi-layer gypsum panels to 20-ga. studs and runners Also available in 2 $\frac{3}{8}$ ", 2 $\frac{5}{8}$ " lengths	1 $\frac{1}{8}$ " Type S-12 Bugle Head	RC-1 RESILIENT CHANNEL TO WOOD FRAMING	
Wood trim over single layer panels to standard studs, runners	1 $\frac{1}{8}$ " Type S Trim Head	Screw attachment required for ceilings, recommended for partitions	1 $\frac{1}{4}$ " Type W, $\frac{3}{8}$ " or 1" Type S Bugle Head (see details above)
Wood trim over double layer panels to standard studs, runners	2 $\frac{1}{8}$ " Type S Trim Head	For fire-rated construction	1 $\frac{1}{4}$ " Type S Bugle Head (see details at left)
WOOD TRIM TO INTERIOR METAL FRAMING			
Wood trim over single layer panels to standard studs, runners	1 $\frac{1}{8}$ " Type S Trim Head	GYPSUM PANELS TO GYPSUM PANELS	
Wood trim over double layer panels to standard studs, runners	2 $\frac{1}{8}$ " Type S Trim Head	Multi-layer adhesively laminated gypsum to gypsum partitions (not recommended for double layer $\frac{3}{8}$ " panels)	1 $\frac{1}{2}$ " Type G Bugle Head

Notes: (1) Includes USG Standard Steel Studs, Steel Runners, Metal Angle Runners, Metal Furring Channels, RC-1 Resilient Channels. If channel resiliency makes screw penetration difficult, use screws $\frac{1}{8}$ " longer than shown to attach panels to RC-1 channels. For 20-ga. Steel Studs and Runners, always use Type S-12 screws. For steel applications not shown, select a screw length which is at least $\frac{3}{8}$ " longer than total thickness of materials to be fastened. USG Brand Screws are manufactured under U.S. Patent Nos. 2,871,752; 3,056,234; 3,125,923; 3,207,023; 3,221,588; 3,204,442; 3,260,100.



Spreader application of adhesive

USG Drywall Adhesives make an important contribution to gypsum panel attachment where the finest room interiors are desired. Their use greatly reduces the nail or screw fastening otherwise required, thus saves labor on spotting and sanding—also minimizes nail pops and other fastener imperfections.

Recommended for laminating gypsum panels to gypsum backing board in multi-layer fire-rated or non-rated partitions and ceilings are **DURABOND Joint Compounds**—dry powder products, applied by spreader, requiring mixing and temporary fastening in application. Provide tight bond when dry, yet permit adjustment of panels after contact.

Newly developed, ready to use, **DURABOND Adhesives** are available in five types:

DURABOND 200 Adhesive—a solvent-base material, applied in $\frac{3}{8}$ " beads, for gypsum panel application to wood or metal framing. May be used with Foil-Back SHEETROCK Panels. Bridges minor framing irregularities; requires minimum field fasteners on ceilings; meets ASTM C557-67.

DURABOND 300 Adhesive—a water-base material, applied in beads, for gypsum panel application to wood framing. Bridges framing irregularities; requires a minimum of permanent fasteners in field of panels. May be used with Foil-Back SHEETROCK Panels; meets ASTM C557-67.

DURABOND 500 Adhesive—a water-base material, for application of prefinished wall paneling to existing wall surfaces. Also used for laminating gypsum panels and backing boards to monolithic concrete, concrete block and wood fiber sound deadening board in non-fire rated construction. Applied by spreader in strips at center and both edges of panel; strips consist of $\frac{1}{4}'' \times \frac{1}{4}''$ beads spaced 2" o.c. Allows board adjustment after erection; provides excellent bond after impacting. Field fasteners not required when panels are prebowed.

DURABOND 600 Adhesive—a water-base liquid contact adhesive for laminating gypsum panels in non-fire rated double layer systems. Roller applied, bonds tightly with impacting. Ceilings only require a minimum of permanent fasteners.

DURABOND 700 Adhesive—a water-base material for applying **TEXTONE** Vinyl Wallcovering directly to vinyl surfaces. Eliminates stripping existing vinyl. Provides fast, firm adhesion and high pull-off resistance.

DURABOND Vinyl Foam Tape is used in conjunction with DURABOND 200, 300 and 500 Adhesives for application of gypsum panels to wood or metal framing, gypsum backing

DURABOND Adhesive Selector Chart

applied surface →	SHEETROCK Panels			TEXTONE Panels
	Reg.	Foil-Back	W/R	
SHEETROCK Gypsum Panels	600†			600
SHEETROCK W/R Gypsum Panels				600
Foil-Back Gypsum Panels	600†			600
Gypsum Coreboard	500			500
Sound Deadening Board (wood & min. fiber)	500			500
Wood Studs, Joists and Furring	200 or 300	200	200 or 300	200 or 300
Painted Surfaces (clean, smooth, sound)	500			500
Unit Masonry (brick, stone, concrete block)	500		500	500
PYROBAR Gypsum Tile	500			500
Metal Studs and Channels	200	200	200	200

†For fire rating, use DURABOND Joint Compounds.

board, sealed plaster, monolithic concrete, and concrete block. Designed for temporary attachment of panels until adhesive attains ultimate strength. Double-faced with pressure-sensitive adhesive for contact bond.

USG Acoustical Sealant is a highly elastic, water-base caulking for sound-rated partition and ceiling systems. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence to most surfaces, permanent flexibility and long-lasting seal.

Also available is **SHEETROCK Brand W/R Sealant**, applied to all cut edges and nail heads of special SHEETROCK Water-Resistant Panels used in high-moisture room areas to protect the gypsum core from moisture penetration.

For complete application specifications, see pertinent U.S.G. System Folders or adhesive application directions.

5. Joint Treatment Products

Today's complete U.S.G. joint treatment line includes both ready-to-use and powder-type compounds. In addition to conventional joint finishing and fastener spotting, certain of these products are designed for repairing cracks, patching, spackling, back-blocking, texturing and for laminating gypsum panels in double-layer systems.

Joint treatment products meet ASTM Standard C475 and Federal Specification SS-J-570A—Type I for joint compounds only, Type II for tape only, Type III for combined joint compound and tape.

general limitations

1. For interior use only; not intended for use on wood or wood fiber products (except in certain lamination applications—see DURABOND Joint Compound below).
2. Bagged and cartoned products require protection against wetting.
3. Each compound coat must be dry before next is applied, and completed joint treatment must be thoroughly dry before proceeding with decoration.

SHEETROCK Gypsum Panels & Accessories

PERF-A-TAPE Reinforcing Tape is a strong, cross-laminated fiber tape with minimal longitudinal stretch and superior tensile strength. Spark-perforated to allow air escape during embedding; lightly pre-creased for corner application. For estimating purposes: for 1,000 sq. ft. of surface area to be finished, approximately 370 lin. ft. of tape and 60 lbs. of powder-type or 6 gals. of ready-to-use type joint compound are required.

USG Brand Joint Compounds

This line of drying-type (non-casein) powder compounds possesses virtually all the desirable features of conventional casein-bound products, but in addition provides greater stability of wet mix consistency and savings in mixing time. Not compatible with casein-type compounds, but may be used over DURABOND and USG Ready-To-Use Compounds.

USG Joint Compound-Taping is designed for embedding tape and for first fill coat on metal beads, trim and fasteners; also used for patching plaster cracks. Outstanding bond and resistance to tape cracking.

USG Joint Compound-Topping is a smooth-sanding, low-shrinkage material for second and third coats over taping compound. Produces excellent feathering and superior finishing results.

USG Joint Compound-All Purpose incorporates good taping and topping characteristics in a single product, for use where finest results of the specialized compounds (above) are not necessary. Also has good texturing properties.

DURABOND Joint Compounds

These hardening-type powder products were developed to provide faster finishing of drywall interiors, even under slow drying conditions. Rapid chemical hardening and low shrinkage permit same-day finishing and usually next-day decoration. Low shrinkage and superior bond are outstanding features: ideal for laminating double-layer systems, particularly fire-rated assemblies. They are not compatible with casein-type compounds. **Limitation:** DURABOND Joint Compound-Taping and 90 are not to be used as finishing coat; must always be completely covered with final application of USG or Ready-To-Use Joint Compound-All Purpose or Topping, or DURABOND Joint Compound-All Purpose.

DURABOND Joint Compound-Taping is preferred for embedding tape and metal accessories; also ideal for heavy fills because it chemically hardens in 3 to 4 hours. Virtually unaffected by high humidity and changes in humidity.

DURABOND 90 Joint Compound is the required pre-fill material for SHEETROCK SW rounded-edge gypsum panels, creating the strongest joints ever developed. Its 1 to 2-hour

hardening time also makes it an ideal alternate to DURABOND Joint Compound-Taping in applications where quicker finishing is desired.

DURABOND Joint Compound—All Purpose is a versatile material that offers the convenience of a single-package product for taping, filling, patching and finishing. Once hardened, it may be immediately decorated with USG Rapid Interior Texture, Texture I Paint or Spray Texture Finish.

DURABOND XL Joint Compound is a distinctively superior product designed to treat joints, fasteners, drywall beads and trims, and areas requiring heavy fills in USG Exterior Gypsum Ceiling Board application. Hardens in 30 to 60 minutes; offers outstanding properties of bond, moisture resistance, edge-crack resistance and low shrinkage.

Ready-To-Use Compounds

Exclusive with U.S.G., new Crater Free Ready-To-Use Joint Compounds are vastly superior to ordinary ready-mixed compounds and are preferred for consistently high-quality work. These vinyl-based formulations are specially pre-mixed to a creamy, smooth consistency essentially free of crater-causing air bubbles. They offer excellent slip and bond, easy workability. Used direct from the container without mixing, thinning or retempering. Available in either machine or hand tool consistency; on-the-wall cost averages the same as with powder compounds. **Limitations:** must protect wet joints and container from freezing; not recommended for laminating.

USG Crater Free Ready-To-Use Joint Compound-Taping is a high-performance product for embedding tape and as a first fill coat over metal bead, trim and fasteners.

USG Crater Free Ready-To-Use Joint Compound-Topping is a low-shrinkage, easily applied and sanded product recommended for second and third coats over USG Ready-To-Use Taping and All Purpose Compounds. Also used as first coat over metal corners, trim and fasteners. Excellent for texturing or skim coating. Not suitable for embedding tape.

USG Crater Free Ready-To-Use Joint Compound-All Purpose, used for embedding, finishing and texturing. Combines single-package convenience with good taping and topping characteristics. Recommended for finishing SHEETROCK SW Gypsum Panel joints over DURABOND 90 pre-fill coat and for finishing over DURABOND Taping Compound; also for repairing cracks in interior plaster and masonry not subject to moisture.

COVER COAT Compound is a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration



unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise), on ceiling areas below grade, on surfaces which project outside the building, or on other areas which might be subject to moisture, freezing, efflorescence, pitting or popping.

Radiant Heat Filler

SHEETROCK R. H. Filler is a high-density, specially formulated product for embedding electric cables in radiant heated ceilings. Provides more efficient heat transmission and greater resistance to heat deterioration. Hand-applied to embed cables to a total thickness of $\frac{1}{4}$ ". Used over special USG R. H. Base attached to wood joists (see U.S.G. Bulletin P-480), to metal furring channels or suspended grillage, or over a bonding agent directly to monolithic concrete ceilings. U. L. listed.

Wood Framing Requirements: wood framing meeting the following minimum requirements is necessary for proper performance of all gypsum drywall fasteners.

1. Framework shall meet the minimum requirements of HUD and local building codes.

2. Framing members shall be straight, true, of uniform dimension, and framing shall be properly aligned.

3. All framing lumber shall be of a good grade for the intended use, and $2'' \times 4''$ nominal size or larger shall bear the grade mark of a recognized inspection agency using grading rules for lumber recommended to American Lumber Standards Committee.

4. All framing lumber shall have a moisture content not in excess of 15% at time of gypsum panel applications.

5. Do not attach gypsum panels to extremely soft framing members.

Failure to observe these minimum framing requirements, which are applicable to screw, nail and adhesive attachment, will materially increase the possibility of ineffective fastening concealment, due to warping or dimensional changes. This is particularly true if framing lumber has greater than normal tendencies to warp or shrink after erection.

Heating and Ventilation Recommendations: framing should approach as closely as possible the moisture content it will reach in service by allowing the building, after it is enclosed, to stand as long as possible prior to the application of the gypsum panels. Provide heat in winter or during damp conditions at a uniform temperature in the range of 50° to 70°F. Provide ventilation to remove excess moisture.

general drywall specifications

notes to architect

The following comments and recommendations cover the basic specifications for normal job requirements, and are intended as minimum guide specifications which can be adapted to specific projects and conditions.

Detailed specifications on the various drywall systems are covered in pertinent U.S.G. System Folders. Other related job conditions should be covered in the plans, details, or specifications.

It is not intended that these specifications shall cover every possible design or job condition, but rather to assist in the preparation of specifications applicable to a given project.

For fire ratings and sound transmission loss data of various assemblies, see U.S.G. Construction Selector.

For painting specifications, see U.S.G. Folder SA-933.

When Back-Blocking or Floating Interior Angle construction is to be specified, see specifications in U.S.G. Folder SA-924.

It is important that light-gauge metal components such as metal studs and runners, furring channels and resilient channels be given

adequate protection in the warehouse or on the jobsite against rusting caused by moisture. In marine areas such as the Caribbean, Florida and the Gulf Coast where chloride as well as sea salt is present in combination with excessively high humidity, it is recommended that components be used which offer increased protection against corrosion.

Temperature differentials in an exterior wall may cause interior condensation which when combined with airborne dust could result in photographing or shadowing over fasteners and furring. Because soiling and temperature differences are variables over which it has no control, United States Gypsum cannot be held responsible for surface blemishes that result. Where temperature, humidity and soiling conditions are expected to cause objectionable blemishes, free-standing furring is recommended.

The only drywall product recommended for the embedment of electric heat cables is SHEETROCK R.H. Filler backed by USG R.H. Base or applied directly to monolithic concrete. See description at left, and U.S.G. Bulletin P-480.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. Gypsum Panels (in lengths as long as practical to minimize number of joints):

(SHEETROCK SW, Regular, FIRECODE, FIRECODE "C", Foil-Back) Gypsum Panels (thickness).

(TEXTONE Vinyl Panels) (type) (color or pattern).

(SHEETROCK W/R Gypsum Panels) (type) (thickness).

b. Gypsum Coreboard: USG Coreboard (length).

c. Gypsum Sheathing: USG Gypsum Sheathing (size).

d. Exterior Ceiling Board: USG Exterior Gypsum Ceiling Board.

e. PYROROCK Sound Underlayment Board (length).

f. Corner Reinforcement: (DUR-A-BEAD No. 101, 103, 104) (No. 900).

g. Metal Trim: USG Metal Trim No. (200-A $\frac{1}{2}$ " or $\frac{5}{8}$ ", 200-B $\frac{1}{2}$ " or $\frac{5}{8}$ ", 200-C, 400, 401 or 402, 700-A $\frac{1}{2}$ " or $\frac{5}{8}$ ", 700-B $\frac{1}{2}$ " or $\frac{5}{8}$ ").

h. Plastic Trim: USG (P-1) (P-2) (RP Series), Vinyl Trim.

i. Resilient Channels: RC-1 SHEETROCK Resilient Channel.

j. Steel Studs: USG Steel Studs (Standard) (20-ga.) (style) (length); USG Light Steel Studs (style) (length).

k. Steel Runners: USG Steel Runners (Standard) (20-ga.) (style). USG Light Steel Runners (style).

l. Metal Furring Materials: (USG Metal Furring Channels and Clips) (USG Adjustable Wall Furring Brackets) (USG Cold-Rolled Channels $\frac{3}{4}$ ", $1\frac{1}{2}$ " or 2") (USG Z-Furring Channels).

m. Drywall Screws: (length) (USG Brand Screw Type S, S-12, S-16, S-18, W or G).

n. Drywall Nails: (length) (type) (USG Matching Color Nails to match finish of TEXTONE Vinyl Panels) (conforming with "Recommended Performance Standards for Nails for Gypsum Wallboard",

SHEETROCK Gypsum Panels & Accessories

adopted by the Gypsum Association and the Gypsum Drywall Contractors International) (as specified in fire-resistive construction).

o. Control Joints: USG Control Joint No. 093.

p. Drywall Adhesives: (DURABOND Joint Compound-Taping, 90 or All Purpose) (DURABOND 200, 300, 500, 600 Adhesive) (DURABOND Vinyl Foam Tape).

q. W/R Sealant: (for SHEETROCK W/R Gypsum Panels) SHEETROCK Brand W/R Sealant.

r. Joint Treatment: PERF-A-TAPE Reinforcing Tape.

DURABOND Joint Compound-(Taping, 90, All Purpose, XL).

USG Joint Compound-(Taping, Topping, All Purpose).

USG Crater Free Ready-To-Use Joint Compound-(Taping, Topping, All Purpose).

s. Caulking: USG Acoustical Sealant.

t. Concrete Finishing Compound: COVER COAT Drywall Compound (as ready-mixed) (with sand additive).

u. Cavity Shaft Wall Materials: USG Shaft Wall Liner, USG Steel J-Runners (size) (gauge), USG Steel T-Studs (gauge), USG Steel E-Studs (size) (gauge), USG Steel J-Struts (gauge).

v. Solid Shaft Wall Materials: USG Laminated Coreboard (thickness) (length), USG Steel J-Runners (thickness) (gauge), USG Steel H-Studs and C-Channels (thickness) (gauge), USG Steel J-Struts (thickness) (gauge).

w. Cavity-type Area Separation Wall Materials: USG Gypsum Liner Panels, USG Steel J-Runners (size) (gauge), USG Steel T-Studs and E-Studs (gauge).

x. Solid-type Area Separation Wall Materials: USG Gypsum Liner Panels, USG Steel J-Runners (size) (gauge), USG Steel H-Studs and C-Channels (size) (gauge).

Part 3: execution

3.1 gypsum panel application

3.1.1 basic single-layer system, treated joints

a. Position all ends and edges of all gypsum panels over nailing members, except when joints are at right angles for framing members as in horizontal application or when end joints are backblocked.

b. Apply SHEETROCK Panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

c. Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive—Nail-On Method) (Double Nailing Method) (Power-driven USG Brand Screws). Space fasteners not less than $\frac{3}{8}$ " from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

d. Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner.

e. Install trim at all internal and external angles formed by the intersection of either gypsum panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions:

(Multi-layer systems: see pertinent U.S.G. System Folders.)

3.1.2 SHEETROCK W/R Gypsum Panels—(see U.S.G. Folder SA-924).

3.1.3 lamination of SHEETROCK Gypsum Panels to interior monolithic concrete and unit masonry

a. The masonry or concrete shall be clean, smooth and dry prior to application. For PYROBAR Tile partitions, mix wall size as prescribed by manufacturer, apply in one coat over entire surface, and allow to dry at least 24 hours. If wood base is to be used, attach wood nailer to wall before lamination is started.

b. Cut face panels to allow continuous clearance ($\frac{1}{8}$ " to $\frac{1}{4}$ ") at floor. Apply DURABOND 500 Adhesive at center and near each panel edge in strips consisting of 4 beads, $\frac{1}{4}$ " wide x $\frac{1}{4}$ " high and spaced 2" o.c. Position panels vertically over wall surface, press into place and impact over entire surface 16" o.c., including edges and ends.

c. Install trim at all intersections of panel surfaces with other surfaces.

d. Lamination to interiors below grade or directly to interior surfaces of exterior walls, and lamination where exposure to moisture is extreme or continuous, are not recommended construction.

3.2 RC-1 Resilient Channel erection

(See specifications in U.S.G. Folder SA-924.)

3.3 metal stud and runner erection

(See specifications in U.S.G. Folder SA-923.)

3.4 metal furring channel erection

(See specifications in U.S.G. Folder SA-923.)

3.5 control joint installation

Attach USG Control Joint No. 093 with Bostitch $\frac{9}{16}$ " "G" staples or equal spaced not over 6" apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.6 fastener and adhesive application

3.6.1 USG Brand Screws

Power-drive with an electric screwdriver so screw heads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than $\frac{3}{8}$ " from edges and ends of board.

3.6.2 nails

Drive nails with heads slightly below gypsum panel surface in a dimple formed by crowned face of hammer. Drive nails no closer than $\frac{3}{8}$ " from edges and ends of panel.

3.6.3 adhesive

Mix and apply in accordance with manufacturer's directions, and as follows:

a. Apply DURABOND Joint Compound-Taping, 90 or All Purpose in the prescribed manner to back of face panels to be laminated. Laminate face panels to (base layer panels) (coreboard) using moderate pressure and temporary nailing or shoring to insure adequate bond.

b. Apply DURABOND (200) (300) Adhesive in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two gypsum panels meet on a framing member, apply a serpentine or zigzag bead with an 8" repeat pattern permitting adhesive to contact each panel edge. For predecorated panels, apply two parallel beads on face of framing at panel joints. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following contact of panel to adhesive, apply necessary fasteners 16" o.c. around perimeter of panel, $\frac{3}{8}$ " away from edges and ends. On ceilings only, apply one temporary field fastener per framing member at mid-width of board; remove after 24 hours. With predecorated panels pre-bowed and applied vertically, use permanent fasteners only at top and bottom of panel.

c. Apply DURABOND 500 Adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four $\frac{1}{4}$ " x $\frac{1}{4}$ " minimum notches spaced max. of 2" o.c. Position face panels against base panels; fasten at top and bottom (vertical application) as required. For laminated ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member installed at mid-width of panel. Press panel into place with firm pressure to insure bond; reimpact within 24 hrs. if necessary.

d. Apply DURABOND 600 Adhesive with a short nap paint roller to cover both contact surfaces. Let adhesive air dry to the touch; about 30 minutes depending on temperature and humidity, until color turns from light blue to darker blue. Apply panels as soon as

possible after drying occurs. On walls, fasten 16" o.c. at top and bottom (vertical application) as required. In ceiling lamination, apply permanent supplementary fasteners at each corner of sheet, and along edges spaced max. 48" o.c. Press panel into place with firm pressure to insure bond.

3.7 pre-fill application

- a. Mix DURABOND 90 Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.
- b. Pre-fill all "V"-grooves formed by abutting eased edges of SHEETROCK SW Gypsum Panels with DURABOND 90 Joint Compound using a flexible 5" or 6" joint finishing knife or Ames Pre-Fill Tool. Fill "V" joint flush and wipe off excess compound beyond the "V" groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to the next application (tape or embedding coat).

3.8 joint treatment application

- a. Mix joint compound in strict accordance with manufacturer's recommendations.
- b. Apply taping or embedding compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply PERF-A-TAPE Reinforcing Tape centered over joint and seated into compound. Sufficient compound—approx. $\frac{1}{64}$ " to $\frac{1}{32}$ "—must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: DURABOND Joint Compounds need only have hardened prior to application of next coat.)
- c. Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out slightly beyond first coat. On joints with no taper, cover the tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: DURABOND Joint Compounds need only have hardened prior to second coat application.)
- d. Spread finish coat evenly over and extend slightly beyond second coat on all joints and feather to a smooth uniform finish. Over tapered edges, do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand between coats and following the final application of compound to provide a smooth surface ready for decoration.

3.9 finishing fasteners

Apply a taping or all-purpose type compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the plane of the surface. Use DURABOND Joint Compound-Taping and 90 only for the first coat on fasteners.

3.10 finishing beads and trims

- a. Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must be thoroughly dry prior to application of second coat. (Exception: DURABOND Joint Compounds need only have hardened prior to application of next coat.)
- b. Apply second coat in same manner as first coat, extending compound slightly beyond onto face of panel. Compound must be thoroughly dry prior to application of finish coat.
- c. Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane of surface. Sand finish coat as necessary to provide a flat smooth surface ready for decoration.

3.11 exterior joint system application

- a. Mix DURABOND XL Joint Compound according to directions on the bag. Do not overmix, nor use in temperatures below 45°F.
- b. Pre-fill joints of USG Exterior Gypsum Ceiling Board with DURABOND XL Compound. After pre-fill has hardened, embed PERF-A-TAPE Reinforcing Tape centered over joint. When compound has hardened, immediately apply fill coat of DURABOND XL.
- c. Apply DURABOND XL Compound over flanges of USG Control Joints, metal beads and trim. Spot fastener heads.

- d. After fill coat has hardened, apply finishing coat of DURABOND XL Compound. Completely cover all joints, angles, beads, control joints and fasteners.

Note: After DURABOND XL has dried, apply one coat oil-based primer-sealer and one coat exterior oil or latex paint.

3.12 COVER COAT Compound application

- a. Concrete surfaces shall be clean, smooth, dry and free from contaminants and exposed metal protected with a rust-preventative paint and allowed to dry.
- b. Mix Cover Coat Compound according to manufacturer's directions and apply to concrete (ceiling) (columns) before interior partitions are erected. Coordinate application of USG No. 900 Corner Bead on angles and corners as required, embedding and covering both flanges with a smooth fill of Cover Coat Compound 3" to 4" wide. Sand surface of each coat after it has dried at least 24 hours. Apply sufficient coats to obtain smooth surface suitable for (texturing) (decoration).

3.13 SHEETROCK R.H. Filler application

- a. Chisel or grind monolithic concrete surfaces as necessary to remove ridges. Coat exposed metal with a rust-preventative paint and allow to dry. Apply a liquid bonding agent to concrete according to manufacturer's directions.
- b. Apply SHEETROCK R. H. Filler to the depth of the cables, then double back with a $\frac{1}{8}$ " coat to a $\frac{1}{4}$ " total thickness. Smooth finished surface to receive decoration.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, DURABOND, FIRECODE, TEXTONE, THERMAFIBER, DUR-A-BEAD, ULTRAWALL, PERF-A-TAPE, PYROBAR, COVER COAT, PYROROCK.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

U.S.G. SALES OFFICES: **ALABAMA:** Birmingham, 870-7970 • **ARIZONA:** Phoenix, 274-5461 • **CALIFORNIA:** Fremont, 792-4400; Los Angeles, 388-1171 • **COLORADO:** Denver, 388-6301 • **DISTRICT OF COLUMBIA:** Washington, 223-8266 • **FLORIDA:** Jacksonville, 396-1628; No. Miami Beach, 949-3436; Tampa, 253-5325 • **GEORGIA:** Atlanta, 393-0770 • **ILLINOIS:** Chicago, 321-4100 •

KANSAS: Mission, 362-1315 • **KENTUCKY:** Louisville, 897-2529 • **LOUISIANA:** New Orleans, 241-2020 • **MASSACHUSETTS:** Waltham, 890-3835 • **MICHIGAN:** Southfield, 357-2000; Grand Rapids, 459-4477 • **MINNESOTA:** Minneapolis, 929-4626 • **MISSOURI:** Maryland Heights, 872-9172 • **NEBRASKA:** Omaha, 333-5204 • **NEW JERSEY:** Cherry Hill, 779-7790; Montvale, 212-935-4487 • **NEW YORK:** Buffalo, 835-8200; Latham, 785-5872; New York, 935-4443 • **NORTH CAROLINA:** Charlotte, 332-5023 • **OHIO:** Cincinnati, 771-3215; Chesterland, 729-1957; Columbus, 451-7710 • **OREGON:** Portland, 227-3731 • **PENNSYLVANIA:** Pittsburgh, 341-0364 • **TENNESSEE:** Nashville, 254-0622 • **TEXAS:** Dallas, 357-6271; Houston, 666-0751; San Antonio, 342-5249 • **UTAH:** Salt Lake City, 359-3751 • **VIRGINIA:** Norfolk, 543-3586; Richmond, 282-0998 • **WASHINGTON:** Bellevue, 455-2595 • **WISCONSIN:** Wauwatosa, 476-5920.

description and utility

The complete and modern product line offered by United States Gypsum in paints and surface treatment is a natural outgrowth of the company's experience. As the world's largest producer of gypsum and other wall and ceiling construction materials, U.S.G. should know best how to finish those surfaces.

Today's full range of USG interior, exterior and special coatings reflects decades of research and testing, both in the laboratory and the marketplace. U.S.G. has the broadest job experience in the industry; 45% of all American homes are built or finished with its various products. Finishing products undergo daily analysis and improvement at the same Research Center where structural materials are developed—to meet standards of quality without compromise.

Use of USG Paints brings the important advantage of dealing with a single manufacturer who is responsible for all components of the finished wall or ceiling—lath and plaster or gypsum panels and joint treatment, drywall screws and adhesives, metal studs and accessories, insulation, sheathing, ceiling tile, gypsum roof deck, asphalt roofing and stucco or mineral siding. All are made by U.S.G. to work together, from DURACAL Texture for exterior surfaces, to FIRECODE 20, a newly released Classified Fire Hazard Coating for interior spray application.

This catalog covers the finishing products recommended for virtually all U.S.G. partition and ceiling assemblies, as well as for exteriors. A complete, quick-reference Selector Guide appears on pages 4 and 5; general specifications start on page 7. Drywall joint treatment products are covered separately in Folder SA-927. USG paint products are available in six special-purpose groups:

Interior Finishes—emulsion line headed by GRAND PRIZE and TAL Latex Wall Paints, both with matching latex semi-gloss enamel. In addition, a complete range of spirit-thinned finishes including PRO-KYD Alkyd Flat Wall Paint, DIAMOND Lustre and Eggshell Enamels, Satin Lustre Enamel.

Exterior Wood and Masonry Coatings—continuing evaluation at U.S.G. Research shows water-based emulsion, breather-type house paints perform superbly over wood siding and shingles as well as masonry surfaces; performance history now favors latex over solvent-based paints for house exteriors. GRAND PRIZE One-Coat Latex House Paint (medium gloss) and Latex House and Trim Enamel (high gloss) are U.S.G.'s premium products. Latex primers are available for wood and metal. USG Vinyl Acrylic Latex House Paint provides low-sheen protection and beauty for primed wood and masonry. Full color range solvent finishes include IMPERIAL Gloss House Paint, USG Low-Lustre House Paint and Porch & Floor Enamel. Masonry coatings are CEMENTICO Masonry Coating, DURABOND Masonry Waterproofing, USG Latex Floor Paint.

Wood Stains and Varnishes—pigmented USG Wood Stains, available in eight colors, are outstanding in uniformity of final finish. USG Rustic Stains provide solid color for exteriors. Varnish products include USG Polyurethane Clear Finish.

Texture Finishes—the industry's broadest line, leading the resurgence of surface ornamentation, includes ready-to-use USG Texture I sand-finish and Texture II ripple-finish; USG Texture and TEXTONE in powder form; IMPERIAL QT Texture Finish for an acoustical appearance on ceilings; USG Spray Texture; A-B TEX and USG R/M Smoothcoat and Texture for special effects and DURACAL Texture for exterior spray application to most surfaces.



Surface Preparation Products—long-established leadership items are USG Vinyl Sealer, SHEETROCK Sealer and pigmented TEXOLITE Primer-Sealer; line includes latex and alkyd interior primers, enamel undercoat, oil-based exterior primers, penetrating sealer, block filler and spackling compounds.

Special Coatings—rising fast in architectural preference are FIRECODE 20, a new fire-resistant latex coating, and ACREPOX Enamel Coating system providing sanitary ceramic-like protection for walls. Also excelling in maintenance value are METAL COAT Enamel and three companion primers to retard and prevent rust.

general limitations

The most common causes of paint failures on interior surfaces are: (a) Base surface not dry; (b) Surface improperly cleaned and patched; (c) Variable suction in the base; (d) Failure to use proper treatment for different surfaces, conditions, and finishes. It is estimated that 75% of interior paint failures are due to neglected or improper preparation before the paint can was opened.

Satisfactory results with USG paint products, as with all finishes, depend upon good job practices:

1. Surfaces to be painted must be clean, dry, sound; free of grease, oil, wax, other foreign matter; free of flaking, crumbling or chalking conditions; must be properly prepared.
 2. Atmospheric and structural temperatures must be 50° to 60° minimum during application, depending upon type of finish; consult directions.
 3. Paints of the water-thinned type should not be used over wallpaper having water-soluble colors; must be protected from freezing.
 4. New unpainted plaster (except veneer plaster), stucco, poured concrete, patches in masonry surfaces must age 30 to 60 days minimum prior to paint application; consult directions.
- Any other limitations are stated in the label directions for each product.

types and functions

1. Interior Wall and Ceiling Paints

GRAND PRIZE Latex Wall Paint—vinyl acrylic flat paint for smooth velvet finish, ready to use. Resists alkalinity in plaster, concrete and joint treatment. Exceptional hide, low sheen and extreme washability. The premium latex flat in U.S.G. line, covers most surfaces in one coat. Quick-drying, with excellent leveling qualities. Vinyl-acrylic latex vehicle. 8 ready-mixed colors, matched in two enamels below.††

GRAND PRIZE Latex Semi-Gloss Enamel—premier medium-gloss enamel, water-thinnable, matching all ready-mixed colors of GRAND PRIZE wall paint. For all interior surfaces where semi-gloss finish is desired. Quick-drying, but good leveling. Superior hide, gives uniform sheen in 40° range; highly washable and stain-resistant. Self-priming on new dry-wall surfaces. Acrylic copolymer emulsion modified with alkyd resin.††

USG Satin-Lustre Enamel—spirit-thinned alkyd semi-gloss matching all ready-mixed colors of GRAND PRIZE wall paint. For wood trim and wall surfaces of kitchen, bath, laundry; sealer or undercoater required on new work and porous surfaces. Dries to medium sheen with outstanding washability, excellent color retention. Alkyd oil resin vehicle.††

USG Spray Coat—spray-applied latex coating for unpainted gypsum panels and most interior surfaces. Produces smooth heavy film of uniform sheen over hard or porous surfaces. Highly scrubbable; burnish and stain-resistant; fast drying. Available in four types: **Soft Lustre**, a semi-gloss eggshell finish, smooth or may be lightly textured in application; **Matte Finish**, a flat enamel finish with heavier texture; **Flat Finish**, a dull, dead-flat finish; **Diamond Finish**, producing appearance of sand float finish. Acrylic latex vehicle.

TAL Latex Wall Paint—ready-to-use flat finish, offers good quality with economy, combines easy-flowing application of latex paints with flatness of alkyds. Good one-coat hide can usually be achieved; provides a washable film. Vinyl-acrylic latex vehicle, uses water for thinning and clean-up. 14 colors, matched in TAL Latex Semi-Gloss Enamel.††

PRO-KYD Alkyd Flat Wall Paint—outstanding spirit-thinned finish for interior walls and woodwork. Excellent hide and leveling, readily washable. Self-priming except over patched, porous or unpainted surfaces. Soya alkyd resin vehicle. Available in white only, plus machine tint bases.

DIAMOND Lustre and Eggshell Enamels—high-gloss and low-lustre finishes of extreme durability to meet the most stringent maintenance demands. Spirit-thinned; provide flexible film with exceptionally high hide. Soya alkyd resin vehicle. White and tint bases available.††

††For flame spread and smoke resistance, request applicable Data Sheet.

USG Exceptional Color System: more than 1,350 appealing custom colors are available on special order through dealers using USG Paint Colorants. This range offered in 11 products—GRAND PRIZE Latex Wall Paint, oil-based PRO-KYD Alkyd Flat Wall Paint, GRAND PRIZE Latex Semi-Gloss Enamel, alkyd oil-based USG Satin-Lustre and DIAMOND Lustre and Eggshell Enamels, oil-based IMPERIAL Gloss House Paint, GRAND PRIZE One-Coat Latex House Paint, GRAND PRIZE Latex House & Trim Enamel, FIRECODE 20 Classified Fire Hazard Coating and R/M CEMENTICO Masonry Coating. Special machine colors also available in USG Wood Stain and Rustic Stain.

2. Exterior and Masonry Coatings

IMPERIAL Gloss House Paint—U.S.G.'s finest oil-based gloss finish, with a balanced oil-based formula for long weather resistance. Heavy-bodied, with superior hiding and controlled chalking qualities. Tough, flexible film resists cracking and checking, offers maximum protection for substrates. Excellent adhesion, mildew and fume resistance. One coat is sufficient on most surfaces when used over IMPERIAL House Primer. Linseed oil vehicle. 3 ready-mixed colors, plus white. Also available, in white only, is **IMPERIAL One-Coat House Paint** for one-coat finish on most repaint work, exceptional durability and hide; used over IMPERIAL House Primer #894 or USG Latex House Primer #684 on new wood.



USG Low-Lustre House Paint—solvent-thinned, quality low-sheen exterior finish offers superior hiding in one coat over primed surfaces—wood shingles and shakes, all types of siding. Self-priming when used over most previously painted surfaces. Linseed alkyd resin vehicle. Available in 5 ready-mixed colors which may be intermixed.

GRAND PRIZE One-Coat Latex House Paint—breather-type modified acrylic emulsion with major advantages over other types: quick-drying, non-yellowing, longer-lasting, mildew-resistant, good bond, pleasing medium lustre. Has excellent hide, controlled chalking. Resistant to alkali, does not readily blister, fade, or stain. Principally for wood siding and shingles, but also performs well over masonry, stucco, weathered asbestos cement. Modified acrylic latex emulsion vehicle. 13 colors.

GRAND PRIZE Latex House & Trim Enamel—water-thinned, high gloss finish provides long-lasting protection for wood trim and siding. Spreads easily, dries fast. One coat covers; gives two-coat beauty. Acrylic and polyester resin vehicle. Provided in 8 ready-mixed colors, plus black, white and machine tint bases.

USG Vinyl Acrylic Latex House Paint—an economical non-penetrating coating for unglazed masonry, stucco, wood shakes and primed siding. Combines good hiding, weather resistance, true non-fading color, quick drying. Breather-type formulation permits unwanted moisture to escape. Two coats produce best results. 15 colors.

DURACAL Texture—a thick, solvent-based or latex aggregated coating for spray application to old or new wood, metal, concrete surfaces; asbestos siding. Heavy texture hides most surface blemishes. Flexible, mildew and water-resistant when applied as recommended. White and special colors in 100-gal. quantities or more.

USG Porch & Floor Enamel—polyurethane modification provides tough, hard-wearing gloss finish for wood and concrete floors, walls and dados in recreation and laundry rooms, corridors, etc. Resists heavy moisture, heat, stains, grease. Quick-drying, water-repellent, alkali-resistant. Spirit-thinned; tolulene diisocyanate soya alkyd copolymer vehicle. 5 colors.

USG Latex Floor Paint—a tough, medium sheen finish for interior or exterior floors of previously painted or primed concrete or wood. Fortified with epoxy resins for wear resistance. Alkaline-resistant, quick-drying, normally bonds without etching, but firm, non-dusty surface is mandatory. White and five dark colors, also in tint bases.

CEMENTICO Masonry Coating—a water-repellent hydraulic cement base paint in powder form, to be mixed with water. For interior and exterior porous masonry surfaces. Excels in hardness, durability and workability. Two coats recommended; sand may be added for coating to be scrubbed into masonry to make smoother, denser surface. Available in white only, it is lime-proof, alkali-resistant. A ready-mixed product **R/M CEMENTICO Masonry Coating**, is available in both white and machine tint bases.

R/M DURABOND Masonry Waterproofing—a heavy-bodied aggregated, ready-mixed product, to decorate and protect against mild water penetration through masonry. Applied in two coats alone or over DURABOND Hydraulic Cement Compound (see Surface Preparation Products). White only, tintable. Special **DURABOND Waterproofing Latex Additive** should be specified to improve adhesion, harden surface, and minimize dryout problems. A powder product, **DURABOND Masonry Waterproofing**, is also available in four colors.



3. Wood Stains and Varnishes

USG Wood Stains—pigmented stains with controlled penetration to bring out the natural beauty of wood paneling, furniture, etc. Alkyd solids content permits partial seal of surface, more uniformity of final finish. Non-bleeding, non-fading, minimum grain raise. Versatile in application—may be sprayed, dry brushed, wiped, or used full strength. Available in 7 popular stains for interior use, plus Redwood for interior or exterior; stains may be intermixed for special requirements. Linseed-phenolic resin vehicle.

USG Rustic Stains—richly pigmented, solid color, exterior stains with exceptional hiding qualities for new work and refinishing of rough and smooth siding, sidewall shakes and wood fencing. Allows wood texture to show through. Not recommended for abraded plywood or concrete. Linseed and resin or latex base. 6 ready-mixed colors plus 12 with tint base.

USG Polyurethane Clear Finish—an interior-exterior pale varnish to meet the highest durability requirements in fine floors, woodwork, exterior doors, boat decks, etc. Gives clear transparent water-resistant finish, easier handling because it is a one-component system. Special vehicle compound of soya oil modified polyurethane provides good adhesion when recoated. Available in Gloss and Satin finishes.

4. Interior Texture Finishes

USG Texture I—a ready-to-use vinyl-acrylic paint embodying a fine aggregate to produce a slight sand-finish effect combined with light texture. One coat covers fine cracks, blemishes. Quick-drying, tintable.

USG Texture II—flat ripple finish in a latex emulsion. Contains no sharp aggregate, can produce fine textures ranging from "orange peel" effect to smooth rounded stipple. Conceals moderate imperfections, normally requires no sealer. Quick-drying, washable, recoatable. Tintable.

USG R/M Smoothcoat and Texture—a heavy-bodied, ready-to-use, vinyl acrylic interior finish. Job-thinned with water for desired effect—smooth, roller-texture or specified texture design. Conceals imperfections; dries to hard white surface. May be tinted with GRAND PRIZE Wall Paint or machine colorants.

USG Painter's Sanded Paste Stipple—a low-cost, water-base sanded finish for interior walls and ceilings. Tinting not recommended; readily coated with most wall paints.



One of several finishes possible with versatile USG Texture II for accent walls or contrast of materials.

IMPERIAL QT Texture Finish—aggregated powder, produces acoustical finish appearance on ceilings; provides no acoustical correction. Excellent bonding qualities; helps conceal surface defects. Formulated with vermiculite, polystyrene or perlite aggregates for spray application in coarse or regular textures. Also available ready-mixed. White only. First coat of PRO-KYD Alkyd Flat Wall Paint recommended. Fire hazard classification: flame spread 10, fuel contributed 10, smoke developed 0 for polystyrene-aggregated formulation applied over SHEETROCK Panels. *Limitation:* not recommended for use where humid conditions exist.

TEXTONE Plastic Texturing Paint—the king of powder textures, especially adapted to heavy stipples, deep textures and a wide range of applications. For hand application; insoluble and durable. Useful for refinishing plaster surfaces, producing stone or antique effects, stencil work; unequalled for concealing wall blemishes. White only, but can be tinted with colorants or coated with most wall paints.

Other powder textures include **USG Texture Paint**, for medium heavy to medium light stipples; **A-B TEX Texture Paint** and **USG Spray Texture** and **USG Multi-Purpose Texture** for fog coats, light stipples and orange-peel textures.

(continued on page 6)

SELECTOR GUIDE TO USG PAINT PRODUCTS

construction materials	type of finish desired	special surface treatment new work redecorating		finish product description	thinners	method application	hours drying time touch recoat	one gal. coverage (sq. ft.)
INTERIOR WALLS	Velvet, Smooth Surface	USG Super Block Filler	USG Super Block Filler (opt.)	GRAND PRIZE Latex Wall Paint	NR/w	B1, R1, S1	½ 8	450
	Velvet, Natural Texture	TEXOLITE Primer-Sealer	None	GRAND PRIZE Latex Wall Paint	NR/w	B1, R1, S1	½ 8	450
	Flat, Smooth Surface	USG Super Block Filler	USG Super Block Filler (opt.)	TAL Latex Wall Paint	NR/w	R1, S1, B2	½ 8	400
	Flat, Natural Texture	TEXOLITE Primer-Sealer	None	TAL Latex Wall Paint	NR/w	R1, S1, B2	½ 8	400
	Semi-Gloss, Smooth Surface	USG Super Block Filler	TEXOLITE Primer-Sealer	USG Satin-Lustre Enamel	NR/ms	S1, B2, R2	3 24	450-500
	Semi-Gloss, Natural Texture	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	USG Satin-Lustre Enamel	NR/ms	S1, B2, R2	3 24	450-500
	Gloss, Smooth Surface	USG Super Block Filler	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	S1, B2, R2	3 24	450
	Gloss, Natural Texture	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	B1, R1, S1	3 24	450
	Epoxy Glaze, Smooth	USG Super Block Filler	USG Super Block Filler	ACREPOX Finish	SS/USG	B1, R1, S1	4 8	190-320
	Cement, Smooth Cement, Sanded	Pre-wet	Clean, pre-wet	CEMENTICO Coating	W	B1, S2	— 24	16-24/lb.
		Pre-wet	Clean, pre-wet	DURABOND Masonry Waterproofing	W	B	— 24	16-24/lb.
Block, Brick, or Concrete	Velvet	TEXOLITE Primer-Sealer	None	GRAND PRIZE Latex Wall Paint	NR/w	B1, R1, S1	½ 24	450
	Flat	TEXOLITE Primer-Sealer	None	PRO-KYD Alkyd Flat	NR/ms	R1, S1, B1	1 24	400
	Flat	TEXOLITE Primer-Sealer	None	PRO-KYD Alkyd Flat	NR/ms	B1, R1, S1	1 24	400
	Semi-Gloss	TEXOLITE Primer-Sealer	USG Alkyd Enamel Undercoat	USG Satin-Lustre Enamel	NR/ms	S1, B2, R2	3 24	450-500
	Gloss	TEXOLITE Primer-Sealer	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	S1, B2, R2	3 24	450
	Epoxy Glaze	USG Penetrating Sealer	ACREPOX Finish	ACREPOX Finish	SS/USG	S1, B2, R2	4 8	190-320
Plaster	Velvet	SHEETROCK Sealer or TEXOLITE Primer-Sealer	GRAND PRIZE Latex Wall Paint	GRAND PRIZE Latex Wall Paint	NR/w	B1, R1, S1	½ 24	450
	Flat	SHEETROCK Sealer	Prime if needed	PRO-KYD Alkyd Flat	NR/ms	R1, S1, B1	3 24	400
	Semi-Gloss	GRAND-PRIZE Latex	Self-priming	GRAND PRIZE Latex Semi-Gloss Enamel	NR/w	S1, B1, R1	½ 24	450
	Gloss	Semi-Gloss Enamel	TEXOLITE Primer-Sealer	DIAMOND Lustre Enamel	NR/ms	S1, B1, R2	3 24	450
	Epoxy Glaze	ACREPOX Finish	ACREPOX Finish	ACREPOX Finish	SS/USG	S1, B2, R2	4 24	190-320
	Sand Float Texture	None	None	USG Texture I	NR/w	B1, R1	½ 24	200
Gypsum Panels	Orange-peel to Ripple Texture	None	None	USG Texture II	NR/w	B1, R1, S1	1 24	200
	Heavy Stipple or Period Texture	As required	As required	TEXTONE; then GRAND PRIZE Paint	W	B, R, O	1 12	9-36/lb.
	Medium Light to Medium Heavy Texture	Usually none	None	USG Texture Paint; then GRAND PRIZE Paint (also 2 finishes below)	W	B, R, O	1 12	27-54/lb.
	Medium Light to Very Light Text. Sand Finish	Usually none	None	A-B TEX or USG Spray Texture	W	B, R, S, O	1 12	27-54/lb.
	Fire-resistant	None	None	USG Painter's Sanded Paste Stipple	W	B, R	1 12	200
				FIRECODE 20 Coating	NR/W	S, R	½ 8	80-100
Wood	Semi-Gloss	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	USG Satin-Lustre Enamel	NR/ms	S1, B1, R2	3 24	450-500
	Gloss	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	S1, B1, R1	3 24	450
	Flat	USG Alkyd Enamel Undercoat	None—dull gloss	PRO-KYD Alkyd Flat	NR/ms	R1, S1, B1	1 24	400
	Clear Finish	2 coats Finish	1 coat Finish	USG Polyurethane Clear Finish	NR	B only	2 12	500
Metal (Ferrous)	Flat (Water Thinned)	METAL COAT Iron Oxide Primer	None, if free of rust	GRAND PRIZE Latex Wall Paint	NR/w	B1, S1, R2	½ 8	450
	Gloss (Solvent Thinned)	METAL COAT Iron Oxide Primer	None, if free of rust	METAL COAT Enamel	NR/ms	B1, S1, R2	2 24	600
Metal (Bright)	Aluminum or Gloss	METAL COAT Zinc Chromate Primer	None, if free of rust	USG Aluminum Coating or METAL COAT Enamel	NR/ms	B1, S1	2 24	600
Metal (Galvanized)	Gloss	METAL COAT Zinc Dust Primer	None, if free of rust	METAL COAT Enamel	NR/ms	B1, S1, R2	2 24	600

NOTES: "Drying Time" and "Coverage" estimates are based on average conditions. Touch = furniture can be returned to living areas.

Abbreviations, Method of Application: B = brush, R = roller, S = spray, T = trowel, O = other; 1, 2, 3 = order of preference. Abbreviations, Thinners: NR/w = Not recommended, use water sparingly; NR/ms = Not recommended, use mineral spirits if needed; SS/USG = Special Solvent manufactured by U.S. Gypsum; W = water per directions.

SELECTOR GUIDE TO USG PAINT PRODUCTS

construction materials	type of finish desired	special surface treatment new work redecorating		finish product description	thinners	method application	hours drying time touch recoat	one gal. coverage (sq. ft.)
INTERIOR CEILINGS	Low Sheen	None	None	GRAND PRIZE Latex Semi-Gloss Enamel TEXOLITE Std. Paint	NR/w NR/w	B1, R1, S2 R1, S1	½ ½	8 8
Acoustical Tile or Plaster	Flat (Low Scrub)	None	None					350
Gypsum Panels	Flat (Med. Scrub) Flat (High Scrub) Textured	None, or TEXOLITE Primer-Sealer TEXOLITE Primer-Sealer USG Texture I or II	None GRAND PRIZE Latex Wall Paint USG Texture I or II	USG Super Ceiling White GRAND PRIZE Latex Ceiling White Paint Any of above finishes for gypsum panels	NR/w see above	B1, R1, S2 see above	½ see above	8 see above
Plaster	Flat Flat	TEXOLITE Primer-Sealer TEXOLITE Primer-Sealer	TEXOLITE Primer-Sealer None, or TEXOLITE Primer-Sealer	PRO-KYD Alkyd Flat Any USG latex paint shown for int. walls	NR/ms —	B1, R1, S1 —	1 —	24 —
Plaster, Drywall, or Poured Concrete	Rough Texture	PRO-KYD Alkyd Flat	PRO-KYD Alkyd Flat	IMPERIAL QT Texture Finish	W	S only	24	not rec.
Poured Concrete	Smooth; Level	None	None	A-B TEX Paint	W	T1	1	12
FLOORS & PATIOS								
Firm Poured Concrete, Brick, Asph.	Medium Sheen	None, if clean, non-dusting; or USG Penetrating Sealer	None; clean, firm	USG Latex Floor Paint	NR/w NR/w	B1, R1 B1, R1, S1	½ ½	24 8
Wood or Concrete	High Sheen	USG Penetrating Sealer; or self-prime	None; clean, firm	USG Porch & Floor Enamel	NR/ms	B1, R1	4	12
EXTERIOR SURFACES								
New—Block, Brick, Stucco or Poured Concrete	Low Sheen Medium Lustre	2 coats 2 coats		USG Vinyl Exterior GRAND PRIZE Latex House Paint	NR/w NR/w	B1, R1, S1 B1, R1, S1	½ ½	8 8
Old, Light Chalk—Block, Brick, Stucco or Poured Concrete	Low Sheen Medium Lustre	Clean, dust-free, wire brush off chalk, 2 coats Clean, dust-free, wire brush off chalk, 2 coats		USG Vinyl Acrylic Latex House Paint GRAND PRIZE Latex House Paint	NR/w NR/w	B1, R1, S1 B1, R1, S1	½ ½	8 8
Old, Heavy Chalk—Brick, Block, Stucco or Poured Concrete	Low Sheen or Medium Lustre Gloss	Clean, dust-free, wire brush off chalk, apply USG Penetrating Sealer & 2-coat finish USG Penetrating Sealer		USG Vinyl Acrylic Latex House Paint GRAND PRIZE Latex House & Trim Enamel	NR/w NR/w	B1, R1, S1 B1, R1, S1	½ 1	8 12
Old or New (unpainted) Block, Brick, Stucco or Poured Concrete	Smooth (Cement) Sanded (Cement)	Clean, free of dust, porous—pre-wet, post-wet Clean, free of dust, porous—pre-wet, post-wet		CEMENTICO Coating DURABOND Masonry Waterproofing	W W	B1, S1 B, T	— —	24 24
Asbestos Siding	Heavy Texture	Clean, dust-free		DURACAL Texture	NR/ms	S only	12	24
Wood Surfaces	Heavy Texture	Clean, dust-free IMPERIAL House Primer #894 White		DURACAL Texture	NR/ms	S only	12	24
Metal	Heavy Texture	Clean, dust-free METAL COAT Zinc Chromate Primer		DURACAL Texture	NR/ms	S only	12	24
New—Unpainted Wood	Low Lustre	USG Low-Lustre House Paint		USG Low-Lustre House Paint	NR/ms	B only	2	24
	Medium Lustre	Dry, clean, apply one coat IMPERIAL House Primer #894, 1 or 2 coats finish paint		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	400
	Gloss	IMPERIAL House Primer #894 White, or Latex House Primer #684		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	400
	Clear Gloss	Prime with USG Wood Stain		USG Polyurethane Clear Finish-Gloss	NR	B1, R1, S1	2	500
	Full Stain	USG Rustic Stain		USG Rustic Stain	NR	B1, R1, S1	2	300
Repaint—Wood Medium Chalk	Low Lustre	Wipe off chalk and dirt		USG Low-Lustre House Paint	NR/ms	B1, S1, R1	2	24
	Medium Lustre	Dust off dirt and cobwebs, wash off chalk		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	400
	Gloss	Wire brush, wipe off chalk and dirt, prime bare spots		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	400
Repaint—Wood Heavy Chalk	Low Lustre	Wire brush, dust and clean		USG Low-Lustre House Paint	NR/ms	B1, S1, R2	2	24
	Medium Lustre	Wash with hose and rag, flush with water		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	400
	Gloss	Wire brush, dust, prime with IMPERIAL House Primer #894 White		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	400
Pre-Primed Wood Siding	Low Lustre	None		USG Low-Lustre House Paint	NR/ms	B1, S1, R1	2	24
	Medium Lustre	None		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	400
	Gloss	None		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, S1, R1	1	12
Hardboard Siding	Medium Lustre	IMPERIAL House Primer #894 White		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8
Asphalt	Low Sheen Medium Lustre	Clean, firm, tight backing		GRAND PRIZE or USG Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8
Metal	Gloss	See primers under "Interior Walls"		METAL COAT Enamel	NR/ms	B1, S1, R2	2	600

5. Surface Preparation Products

TEXOLITE Primer-Sealer—a pigmented latex product for use under any type of paint or enamel, performs better under water-thinned paints than any other sealer. Locks in lime, equalizes suction, lays paper and fiber nap, provides "tooth". White only, but may be tinted with USG Paint Colorants.

SHEETROCK Sealer—a tung oil resin emulsion sealer for use over gypsum panels; also unsurpassed in bridging and filling hairline cracks in plaster. May be used under all interior paints and wallpaper. Equalizes porosity over joint reinforcement and face paper. Especially recommended for kitchens and bathrooms. Should be tinted to shade of finish coat.

USG Vinyl Sealer—a pigmented, quick-drying primer-sealer for use on interior gypsum panels, plaster, canvas, concrete block. Especially recommended for use under alkyd paints and enamels. May be tinted.

USG Latex Primer-Finish for Metal—for clean interior or exterior metal surfaces. Rust-inhibiting pigments provide corrosion resistance and durability. Use at least two coats for exteriors. White, may be tinted and used as finish coat in exterior application. Acrylic latex vehicle.

USG Alkyd Enamel Undercoat—alkyd base mineral spirit undercoat for interior gloss, semi-gloss or flat oil paints. Not a sealer, but provides low-cost good first coat; fills and equalizes surface to be painted. May be tinted.

USG Penetrating Sealer—a special non-pigmented alkyd resin solution in spirits, designed to condition exterior or interior surfaces which are porous or moderately chalky; forms firm tight base for repainting with any paint except cement bonding type. May be tinted.

USG Latex House Primer #684—for exteriors under GRAND PRIZE Latex House & Trim Enamel and House Paint. Quick drying; stain and mildew-resistant; lead-free. White only.

IMPERIAL House Primer #894—oil-base primer to prepare new or chalky wood surfaces for GRAND PRIZE or IMPERIAL One-Coat House Paint. Lead-free, blister-resistant, breather-type coating. White only.

USG Super Block Filler—conceals voids, fills pores, gives uniform finish over interior, exterior masonry and other rough surfaces. Not a waterproofing material; may be coated with any paint except cement bonding type—IMPERIAL House Paint or GRAND PRIZE One-Coat Latex House Paint recommended for exteriors. May be tinted. Unaggregated.

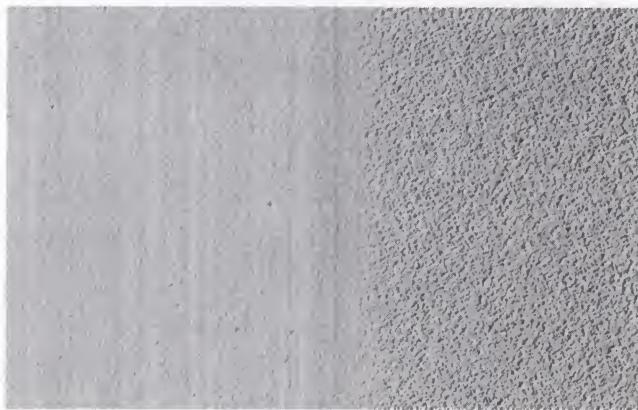
DURABOND Hydraulic Cement Compound—a quick-setting hydraulic powder compound to control water penetration, plug cracks and openings in masonry. Also excellent for anchoring fixture bolts. Natural color, may be overcoated with DURABOND Masonry Waterproofing colors (see Exterior and Masonry Coatings).



6. Special Coatings

FIRECODE 20 Classified Fire Hazard Coating—a formulation for interior application in schools, hospitals and commercial buildings where fire resistance and smoke generation are critical. For spray application, primarily on unpainted gypsum walls and panels, but also suitable for plaster or unglazed masonry surfaces. May be roller-applied using two or three coats.

FIRECODE 20 is a white, high-build, washable, flat latex coating; may be tinted with USG Paint Colorants. Fire hazard classification: flame spread 20, when applied over SHEETROCK Gypsum Panels, or 10 over $\frac{1}{4}$ " asbestos cement board; fuel contributed 0, smoke developed 0.



At 2x magnification, FIRECODE 20 test sample is nearly new after 800 scrub cycles.

ACREPOX Finish—two-component system to provide a smooth, tile-like surface over concrete block, masonry, wood, gypsum panels, metal or hardboard. Exceptionally durable, it resists abrasion and stains, offers high film build and excellent drying. Consists of:

ACREPOX Enamel is a high solids polymer formulation available in six colors. It is mixed with **ACREPOX Enamel Activator** for curing and hardening into a chemical-resistant coating providing maximum performance. For spraying consistency and to aid in equipment cleanup, **ACREPOX Thinner** is used. For thorough sanitary protection of masonry block, two or three coats of **ACREPOX Enamel** are applied over **USG Super Block Filler**. Over masonry and over ferrous metal surfaces for rust retardance, and where a chemical and alkali-resistant coating is desired, **ACREPOX Epoxy Primer** is used. Prior to use, the primer is mixed with special **ACREPOX Epoxy Primer Catalyst** as the curing and hardening agent.

METAL COAT Enamel—a durable gloss finish, highly weather resistant, for interior and exterior metal surfaces. Spirit-thinned; soya alkyd resin vehicle. Comes in 11 safety colors ideal for equipment identification in plants. Used over any of three rust-retardant special primers: **Zinc Chromate**, for bright metals; **Iron Oxide**, for ferrous metals; **Zinc Dust**, for zinc and galvanized surfaces.

SHEETROCK Smooth Coating—unique powder compound, mixed with water, spray-applied to drywall or plaster to provide an ideal base for decoration where a smooth, unblemished wall or ceiling is desired. Quick, economical means to an interior paintable surface. Available ready-mixed.

Industrial Finishes—Shop coats, primers and other special coatings marketed by U.S.G. Paint Division.

general painting specifications

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

- a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.
- b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

- a. During cold weather, thermostatically controlled heat shall be provided to maintain (50°) (55°) (60°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used to provide heat. Adequate ventilation shall be provided at all times for proper drying.
- b. For exterior painting, atmospheric and surface temperatures shall be above 50°F. Paint shall not be applied in damp, foggy or rainy weather.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from product descriptions and Selector Guide in this catalog. For Federal Specification paints, Industrial Finishes and other paints, ask your U.S.G. representative for recommendations, color samples, etc.)

2.2 colors

Colors of paints shall (match control samples) (match color chips specified) (be as scheduled).

2.3 tinting and mixing

Paints shall be tinted and mixed to specified colors using USG Paint Colorants and delivered ready-mixed to job site.

Part 3: execution

3.1 surface preparation

- a. Before painting, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material.
- b. **Interior plaster surfaces**—on old plastered walls, fill all hairline cracks with TEXOLITE Spackling Putty. Fill larger cracks with DURABOND Patching Plaster. Sand rough edges and allow time for spackled and filled areas to dry. Dull the glossy areas by rubbing lightly with fine steel wool or washing with a strong washing powder solution followed by a thorough rinse with clean water. Allow to dry before proceeding. Touch up the spackled and patched cracks and areas with SHEETROCK Sealer. Allow to dry. Follow with a brushed-on coat of SHEETROCK Sealer over all areas. On newly plastered surfaces, treat cracks and gouges in the same manner as for old walls. Apply a coat of TEXOLITE Primer-Sealer. When reinforcement of white coat is needed, use USG Penetrating Sealer.
- c. **IMPERIAL veneer plaster surfaces**—proper sealing of surface is essential. Surface must be sound and dry as outlined above; repair minor imperfections with TEXOLITE Paste Spackling Compound or USG Ready-Mixed Joint Compound-All Purpose. When dry, apply one or more coats of TEXOLITE Primer-Sealer of (if surface is weak, friable or chalky) apply USG Penetrating Sealer. Tint the primer-sealer coat to aid in detection and repair of surface defects; seal any patches or fills revealed after first primer-sealer application. Either water-thinned or solvent-thinned flats or enamels may be used for finish coats.
- d. **Interior gypsum panel surfaces**—prepare joints and fastener heads with (USG) (DURABOND) Joint Compound (see Specifications in U.S.G. Folder SA-927).

- e. **Interior wood surfaces** (except floors)—in new wood not previously painted, sand smooth and touch up knots, sap streaks and pitch spots with shellac.

- f. **Interior metal surfaces**—remove grease, oil and plaster spatterings, rust and mill scale.

3.2 application

- a. Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats. On enamel and varnish finishes, sand lightly and remove dust between coats.

Note to architect: Where more detailed specification is desired, select from specialty applications shown below.

- b. **SHEETROCK W/R Gypsum Panels**—Seal SHEETROCK W/R Panels with SHEETROCK Sealer or USG Alkyd Enamel Undercoat as prime coat. Apply finish coat of USG Satin-Lustre Enamel DIAMOND Lustre or Eggshell Enamel, or ACREPOX Finish System.

- c. **Predecorated Gypsum Panels**—for additional surface protection of predecorated TEXTONE Gypsum Panels, apply (one) (two) coat(s) of USG Polyurethane Clear Finish (Gloss) (Satin).

d. **IMPERIAL QT Texture Finish**

1. All surfaces, including joint compound applications, spackling or patching treatments, shall be dry, clean and sound. Remove any water-soluble materials from surface. Dull or roughen any glossy surfaces. Prime all metal surfaces with a rust-inhibitive oil primer. Fill and seal any exposed wood surfaces.

2. Allow new concrete ceilings and any new concrete patches or repairs to age at least 60 days before applying IMPERIAL QT Finish. Remove form oils, efflorescence, grease and other deposits from all concrete surfaces. Finish any patched or repaired areas to provide a uniform texture and surface.

Grind down any ridges or other protrusions resulting from forms or other causes to the same level as adjacent surfaces; remove all grinding sludge or dust. If filling is required, apply DURABOND Joint Compound System (always overcoat with USG Ready-To-Use Joint Compound-All Purpose), COVER COAT Compound, USG Super Block Filler or R/M Smoothcoat and Texture. Apply in as many coats as are needed to provide a level, crack-free fill without edge joinings that show through decoration.

3. Exercise special care to provide a smooth level surface, free of irregularities, in areas which will be exposed to sharply angled lighting.

4. In drywall construction, treat joints and fastener heads with a joint system manufactured by the United States Gypsum Company, following manufacturer's instructions. Smooth and spackle any scratches or scuffs in drywall surfaces.

5. When all surfaces are prepared and dry, apply a full coat of PRO-KYD Alkyd Flat Paint over entire surface. Allow to dry.

6. Mix IMPERIAL QT Texture Finish with water only as directed by manufacturer. Use spray equipment of a size and type to assure acceptable results. Apply by spray only at a coverage rate not to exceed 8 sq. ft. per lb. and in accordance with directions printed on the container. Apply material to blend uniformly and cover fully without starved spots or other evidence of thin application. Provide uniform texture without application patterns. Remove any texture droppings or overspray from walls, windows and floor, leaving room clean for following trades.

e. **FIRECODE 20 Classified Fire Hazard Coating**

Note to architect: Application of FIRECODE 20 at a rate between 80-100 sq. ft. per gal. provides a wet thickness of 16-20 mils. Airless spray is the normal method of application, capable of film thicknesses up to 20 mils; sufficient thickness may also be obtained in two or three coats using roller application. FIRECODE 20 Coating is supplied white but may be tinted with any of the USG Paint Colorants in the pastel or "P" range.

1. Normally used as provided in the can. Thin, if desired, with small amount of water.

2. Use airless spray according to manufacturer's directions.

f. **ACREPOX Finish**

Note to architect: Application of ACREPOX Enamel at a rate between 350-400 sq. ft. per blended gallon provides a dry film thickness of approximately 5 mils per coat applied. Over masonry and ferrous metal (excluding aluminum), ACREPOX Epoxy Primer should

be used at dry film thickness of about 2-3 mils, developed by application of 275-400 sq. ft. per blended gallon. On masonry, concrete block and similar rough surfaces, USG Super Block Filler is used as a base coat under ACREPOX Enamel; when each coat of enamel is thereafter applied at a rate of 350-400 sq. ft. per blended gallon, a wet film thickness of 4 to 5 mils is developed. For tested performance characteristics of ACREPOX Finish, request U.S.G. Data Sheet T-1113.

1. As indicated in the respective sections, gypsum panels, concrete and cinder blocks, poured concrete walls and ceilings, plaster, asbestos board, masonry, hardboard, plywood interior and exterior surfaces shall be coated as specified.

2. Attempt application only when the interior temperature can be continually maintained in a uniform range above 50°F. for a minimum of 24 hours before, during and after application, and when exterior surfaces and air temperature will remain above 50°F. Strong drafts are to be avoided during application, but adequate ventilation must be provided during application, and for at least 24 hours after application is completed. When there has been rain or snow for several days before, during and after application, then the period of ventilation shall be extended to at least 72 hours after application.

3. *Concrete, Concrete Block and Brick*—remove protruding mortar, droppings, spatters, repair blemishes. Prime with blended ACREPOX Epoxy Primer or apply USG Super Block Filler in one or two full coats. Follow with ACREPOX Enamel in two, or preferably three, coats. Allow drying period between each coat per manufacturer's directions.

4. *Metal*—sand-blast or wire-brush to bright appearance, remove all oil and grease. Prime rust-free metal with ACREPOX Epoxy Primer. Follow with activated ACREPOX Enamel.

5. *Gypsum Panels*—joint and nailhead treatments must be thoroughly dry. Remove all dust, other foreign matter. Follow with two coats of ACREPOX Enamel; allow adequate curing time between coats. (USG Vinyl Sealer or Penetrating Sealer may be used as first coat.)

6. *Hardboards, Cement-Asbestos Boards*—surfaces must be clean and dry prior to application of ACREPOX Enamel.

7. *Plaster*—surfaces must be clean and dry. Meter reading must show not more than 6% residual moisture. Apply USG Penetrating Sealer on unpainted lime putty surfaces; follow with ACREPOX Enamel.

8. *Wood*—sand smooth, dust clean prior to application of ACREPOX Enamel. Thin first coat slightly with ACREPOX Thinner; sand lightly between coats.

9. *Previously Painted Surfaces*—after cleaning, test blended ACREPOX Enamel on small area to determine compatibility with old coating. No lifting of old paint shall occur. If lifting appears, remove old coating and treat as new surface prior to application of ACREPOX Enamel.

10. *Smooth, Non-porous Surfaces*—apply two or more coats of ACREPOX Enamel, allowing drying period between coats of at least 48 hours.

g. Metal Surfaces

1. Flow on METAL COAT (Iron Oxide) (Zinc Chromate) (Zinc Dust) Primer in full uniform coat. Provide ample circulating ventilation during and after application.

2. Apply METAL COAT Enamel by (brush) (roller) (spray).

h. *Acoustical Plasters*—paint acoustical plasters only after surfaces have been properly vacuum cleaned. Spray-apply TEXOLITE Standard Paint or GRAND PRIZE Latex Semi-Gloss Enamel in white or light tint as specified. (Mix TEXOLITE paint 1:1 with water for first coat; 1:2 with water for second coat. Mix one gal. GRAND PRIZE Paint to 1/2 pt. water for first coat; 1 gal. paint to one pt. water for second coat.) Use standard spray atomizing equipment with sufficient fluid and pressure for light uniform coverage. Avoid piling up paint at laps, joinings, or elsewhere. Dust paint in alternating fashion from both sides of raised texture.

i. *Radiant Heat Ceilings*—after sealer coat of TEXOLITE Primer-Sealer has dried, apply () finish coats of GRAND PRIZE Latex Wall Paint. With installations employing RED TOP Radiant Heat Plaster or SHEETROCK R.H. Filler, de-energize heating cable for at least 6 hours prior to painting and until paint is dry.

j. *Poured Gypsum Roof Decks*—in finishing the underside of USG formboards supporting poured gypsum roof decks, a breathing type paint film and fortification against mildew are required. On all formboard types except mineral fiber and asbestos-cement, apply TAL Latex Wall Paint, reinforced by job-site addition of fungicide. On mineral fiber types, apply 1 or 2 coats PRO-KYD Alkyd Flat Wall Paint with fungicide. On asbestos-cement formboard, apply GRAND PRIZE One-Coat Latex House Paint; additional inhibitors not required.

k. *Precast Gypsum Roof Decks*—before painting, USG Metal Edge Gypsum Plank must be dry and galvanized edging must be free of grease or oil. Paint edging with METAL COAT Zinc Chromate Primer; seal gypsum surfaces with SHEETROCK Sealer. Allow metal primer and sealer to dry. Apply 1 or 2 coats GRAND PRIZE Latex Wall Paint or PRO-KYD Alkyd Flat Wall Paint. If it is necessary to paint before plank is dry, prime metal edging as above, paint edging and gypsum with TEXOLITE Standard paint reinforced with 1½-oz. Dowicide "G" fungicide per gallon of paste.

l. *Water Storage Tanks*—in coating inside of tanks, surfaces must be free of rust, grease, oil, grit, or any foreign matter; bright metal should be sand-blasted. Apply one coat ACREPOX Epoxy Primer to wet film thickness of 4 to 5 mils. Then apply two coats of ACREPOX Enamel to wet film thickness of 4 to 5 mils, with overnight drying between all coats. Apply to full, complete, continuous film. Before immersion, allow minimum of 7 days curing time if temperature is above 70°F., or 14 days if between 50°F. and 70°F.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, TEXOLITE, GRAND PRIZE, DIAMOND, PRO-KYD, CEMENTICO, FIRECODE, DURACAL, IMPERIAL, TEXTONE, TAL, A-B TEX, METAL COAT, ACREPOX, SHEETROCK, PERF-A-TAPE, DURABOND, RED TOP, IMPERIAL, COVER COAT.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.
U.S.G. SALES OFFICES, PAINT DIVISION: **ILLINOIS:** Chicago, 321-5714 •
NEW YORK: New York City, 935-4430 • **TENNESSEE:** Nashville, 292-6658
• **TEXAS:** Dallas, 357-6271.

SA

1020

ULTRAWALL Movable Partitions

the one-time investment
that pays off each time space needs change

system folder





Floor-to-ceiling glazed sections of
ULTRAWALL Partitions provide privacy with
visual openness in conference room.

Beauty with function is offered in corridor area by
high-performance **ULTRAWALL** Partition. Wall's vinyl facing
combines contemporary look with minimum maintenance.



Clean-lined, self-supporting **ULTRAWALL** Partitions in
bank-rail height combine office privacy with openness
for deep natural light penetration.

ULTRAWALL— the easy-come, easy-go partition system— easy to install, easy to move . . . with the handsome look of permanence

ULTRAWALL Movable Partition Systems give new dimensions of function, utility and versatility impossible with fixed partitions. ULTRAWALL Systems offer independent erection on each side and individually removable panels for total cavity access. They cope beautifully but economically with the needs of commercial, industrial and institutional clients beset with frequent space alterations.

Easy-to-build, easy-to-move, non-load bearing walls with high fire and sound ratings are provided from only four basic components: noncombustible gypsum panels $\frac{3}{4}$ -in. thick, 24 and 30-in. wide set in steel runners and framed with three alternate metal stud systems (see page 5 for details). No exposed studs, battens or fasteners interrupt the smooth, clean-lined effect.

ULTRAWALL Partitions in bank rail, cornice or ceiling height are available with prefinished vinyl panels in 27 standard colors and five patterns as well as in ready-to-decorate plain gypsum panels.

Skilled installation is provided by experienced U.S.G. licensed contractors, and nationwide distribution assures prompt delivery of all components. The result is earlier completion, quicker occupancy.

Engineered for Quick Change—ULTRAWALL is one of the fastest-installing partitions; also relocated with maximum time savings.

The secret of speedy assembly is in the simplicity of component design and the ease of construction. Components are quickly moved for rearrangement of space or utilities, yet offer the appearance, rigidity, and advantages of permanent partitions.

Esthetic Versatility—More freedom of design with more functional capability makes ULTRAWALL adaptable to virtually any building plan or to the client's changing requirements—without waste of material. Bank rail, cornice and ceiling systems use the same basic components that differ only in type and placement of studs. Systems work interchangeably—fit all standard ceiling grid modules, permit ceiling heights to 12 ft., unglazed railing height to 48 in., and afford ample chase space of $1\frac{1}{8}$ -in. for concealed wiring, standard-sized electric boxes and sound control blankets. ULTRAWALL Partitions allow erection on both sides or one side only to suit future tenant needs. Individual panels are removable for ready accessibility where needed. Beveled-edge panels are integrally kerfed to engage and conceal the studs.

Total flexibility extends to a choice of decorative panel surfaces, easily attached accessories for corners and windows, and color-anodized aluminum trim finish in new ULTRABRONZE.

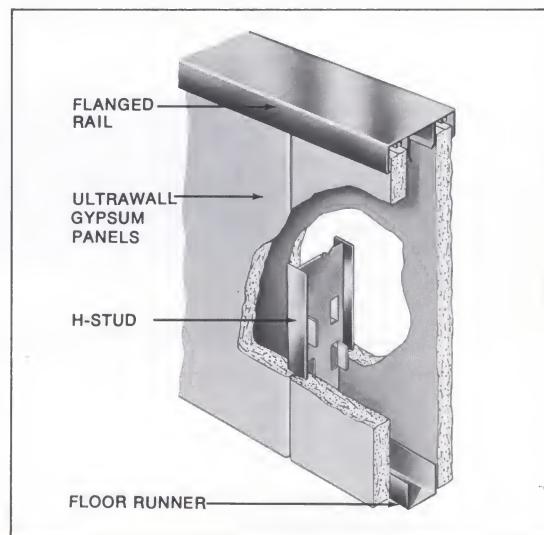
A unique door frame is completely reversible (right or left hand) even after initial installation. Hinge and strike locations adjust to premortised doors for quick, flexible attachment, plus two- or three-piece aluminum frames in a choice of two styles (see Specifications, page 12). Glazing components permit the use of glass anywhere.

Contemporary Styling—ULTRAWALL is engineered better for better design esthetics. Structural attachments are concealed, battens eliminated, and panels are mounted flush to present a smooth-faced, permanent partition appearance. The elegant colors and deep-dimensional appearance of vinyl finish add distinction and beauty . . . give complete freedom to control the tone and atmosphere of building interiors.

Woodgrained vinyl facings can be used to lend dignity, quality and prestige . . . or dramatic colors and deep-textured patterns can be selected to project an image of richness and importance . . . crisp, bright pastels are available to impart a modern clean-lined look. The appearance of spaciousness is achieved with easily installed glazing elements and aluminum trim.

Important Economies—ULTRAWALL lowers in-place assembly, re-erection, replacement and maintenance costs. Actual job studies have shown labor costs to be considerably below those for fixed partitions. ULTRAWALL frequently out-prices most other movable partitions. That's because its multi-purpose components and prefinished panels are engineered to work together to cut time and labor on the job.

Relocation costs are a fraction of the expense of changing a fixed partition, and often less than most other removable partitions. Components are salvageable and reusable. There's no waste, no debris to clean up. Maintenance is minimal: vinyl-surfaced panels require little cleaning, no repainting. Satin-finish trim for glazing and door frames are of extruded, anodized aluminum for other maintenance advantages.



Four basic components provide simplicity in design, layout, estimating, erection, moving, reassembly and replacement. ULTRAWALL Partition construction covered by U.S. Patent No. 3,027,605, other patents pending.

High Fire and Sound Ratings—Code approvals have been readily attained with ULTRAWALL Systems—all components are noncombustible. The 24-in. panel assembly with sound attenuation blankets offers a 2-hour fire rating. Both 24-in. and 30-in. panels in floor-to-ceiling height assembly carry a 1-hour fire rating without *extra* material. Most other movable partitions require special studs or added fire protection in the cavity to meet code approvals. There are no non-rated panels mixed with rated panels (when both types are part of the job) to keep separate or search for. See table below for ratings.

ULTRAWALL Partitions also provide maximum privacy and exceptional sound control. With THERMAFIBER Sound Attenuation Blankets in the wall cavity, ULTRAWALL offers a 48 STC rating—42 STC without attenuation blankets. No other movable partition system provides such ratings without the addition of other materials. Where higher sound requirements are called for, an ULTRAWALL Partition with double panels offers a 50 STC rating.

fire and sound ratings

assembly description	test no.	fire rating	STC rating
Movable ULTRAWALL Partition—concealed H-studs 24" o.c.—steel runners— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels—joints unfinished wt 7 width 3 $\frac{3}{8}$ "	U of C(2) 8/18/67 BBN-701008(1)	1 hr. 42	
Same construction as above except with $\frac{3}{4}$ "x30" ULTRAWALL gypsum panels	U of C(2) 7/23/69	1 hr.	
Same construction as above except with $\frac{3}{4}$ "x30" ULTRAWALL gypsum panels and aluminum ceiling runner	WJE(3) 12/29/70	1 hr.	
Movable ULTRAWALL Partition—concealed H-studs 24" o.c.—1" THERMAFIBER sound attenuation blankets— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels—joints unfinished wt 7 width 3 $\frac{3}{8}$ "	BBN-701216(1)		47
Movable ULTRAWALL Partition—concealed H-studs 24" o.c.—1 $\frac{1}{2}$ " THERMAFIBER sound attenuation blankets— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels one side—double layer opposite side with $\frac{3}{4}$ " Z-splines between layers—joints unfinished—perimeter caulked—painted wt 12 width 4 $\frac{1}{2}$ "	UL Des U416(5) TL-70-198(4)	2 hrs. 50	
Movable ULTRAWALL Partitions—concealed T-studs both sides 24" o.c.— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels—joints staggered and unfinished—perimeter caulked wt 8 width 3 $\frac{3}{8}$ "	TL-70-252(4)		40
Same construction as above with 1 $\frac{1}{2}$ " THERMAFIBER sound attenuation blankets wt 8 width 3 $\frac{3}{8}$ "	TL-70-251(4)		48



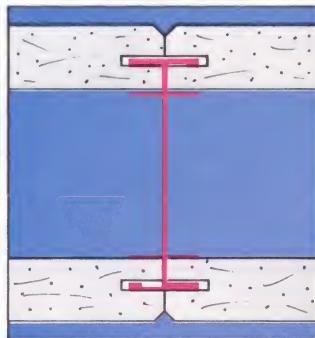
Precision-fitting, simplified ULTRAWALL Partition Systems installed by U.S.G. licensed contractors insure that the finished job will provide quality performance.

limitations

1. Non-load bearing.
2. Not recommended where exposed to excessive moisture.
3. Limiting heights for Ceiling Height Partition: for 24-in. panel employing H-R or H-studs 12 ft.-0 in., T-studs 12 ft.-6 in.; for 30-in. panel employing H-R or H-studs 10 ft.-0 in., T-studs 11 ft.-6 in. Limiting height 48 in. for unglazed Railing Height. When the rigidity of a permanent partition is desired, maximum height is 10 ft. and perimeter restraint must be provided.
4. Limiting unrestrained length between supports of Cornice Height Partitions, including those with door openings joined by continuous top rail, must not exceed 15 ft. Solid core doors must not be used on Cornice Height Partitions over 10 ft. long.
5. Limiting unrestrained length between supports of Bank Rail Partitions having continuous top rail must not exceed 15 ft. Longer runs require rail struts or intersecting partitions at 15-ft. intervals. Rail struts also required at terminals, swinging gates and max. 10-ft. intervals on free-standing partitions. When bank rail is installed over lightweight concrete floors, L- or T-intersections are recommended at free-standing terminals and at 15-ft. intervals.

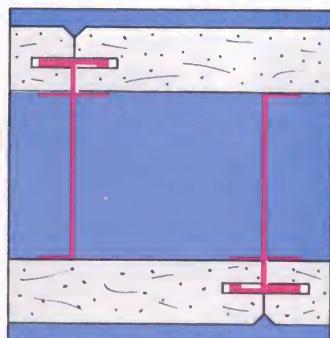
Three interchangeable, fast-installing systems— each with special advantages

Each ULTRAWALL assembly offers major advantages in simplicity, low cost and design features—provides maximum versatility with economy and ease of installation. Systems can be interchanged in the same installation, as described below, to provide accessible panels only where needed. The only variable is the stud.



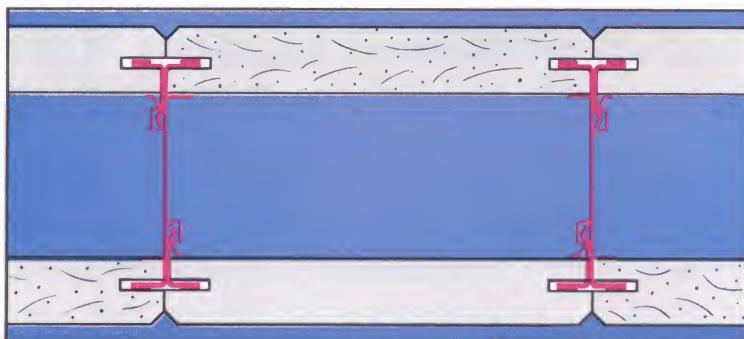
Standard H-Stud System

One of the fastest, simplest movable partitions—outstanding for low cost. The system is assembled, dismantled and reassembled quickly. And because accessibility usually is not required for most buildings (electricians and other trades quickly make changes without removing panels), this ULTRAWALL system is virtually without equal. For quickest installation and lowest in-place cost of the three ULTRAWALL Movable Partitions, specify the standard H-stud system.



T-Stud System

Allows erection of one side of the partition only, if desired. This permits completing the partition after adjoining space is leased, allowing the tenant to select his own surface covering. Additionally, when considerable electrical work is to be installed, it is simpler to leave the partition semi-finished, allowing other trades to complete their work before the second side is enclosed. T-studs may be interchanged with H-R or H-studs. An outstanding choice for tenant or service walls.

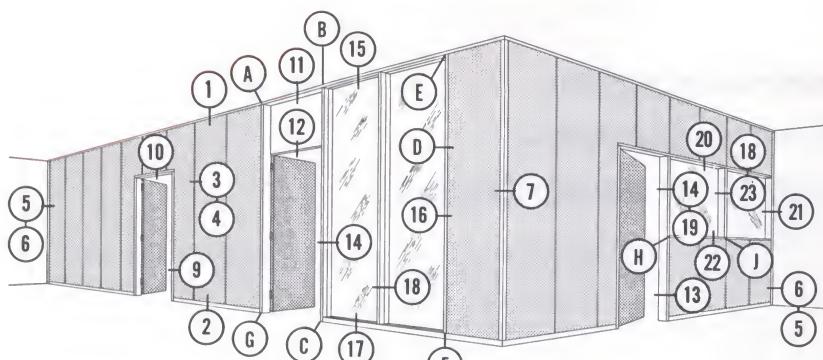


H-R Stud System

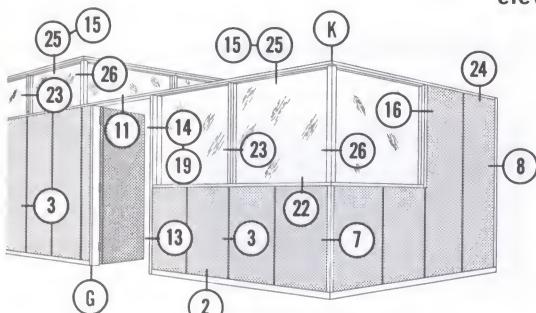
Provides access with full security. Opposite panels cannot be removed, yet alternate panels are easily removable and replaceable, providing future access to each cavity. H-R studs snap in place, the same speedy installation as H-studs. They can be used for a single panel, a series or an entire installation. All other components remain the same; only the stud is changed.

elevations / details

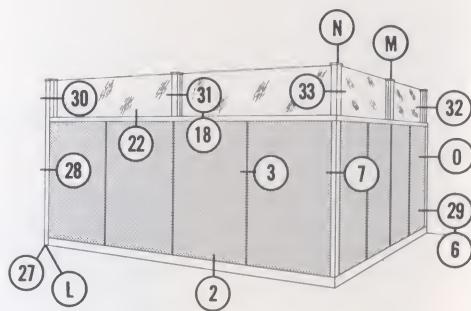
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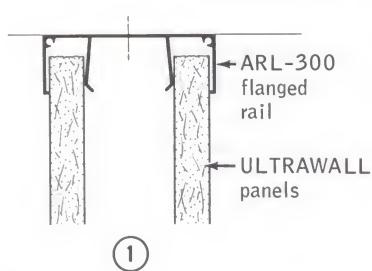
elevation A



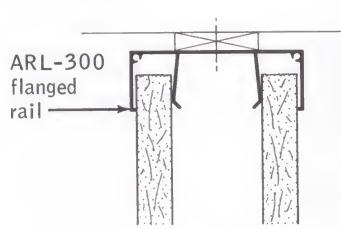
elevation B



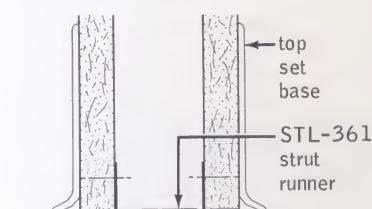
elevation C



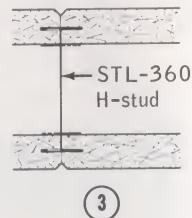
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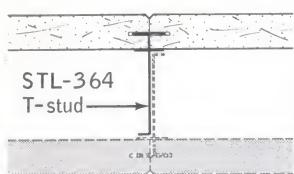
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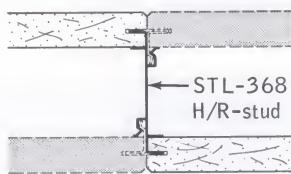
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③



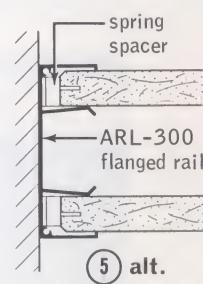
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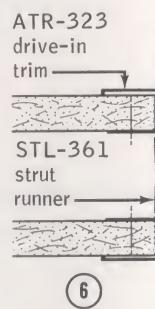
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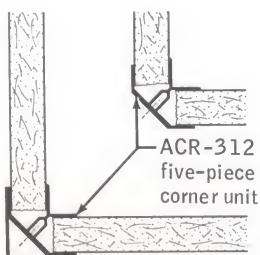
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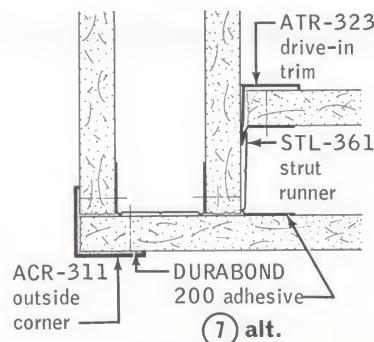
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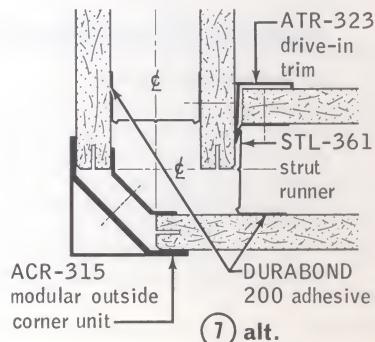
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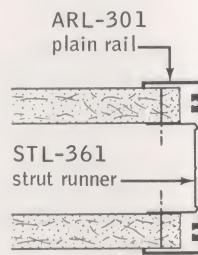
⑦



⑦ alt.



⑦ alt.

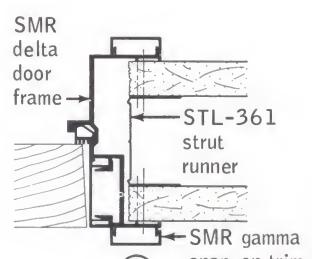
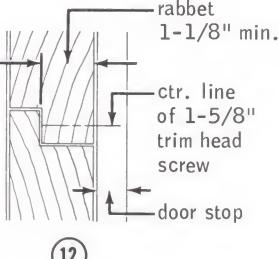
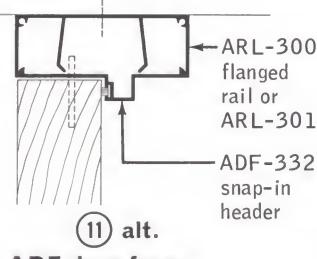
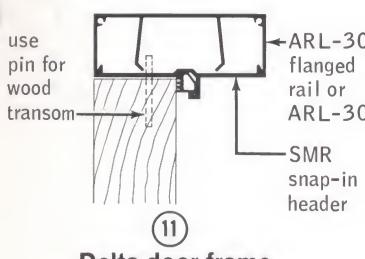
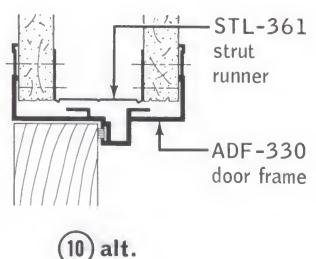
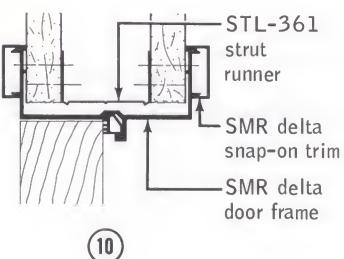
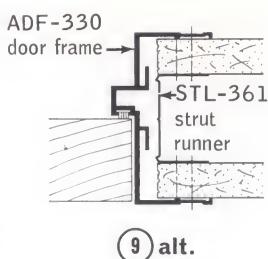
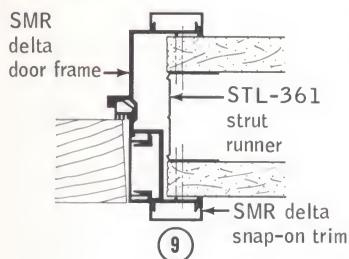


⑧

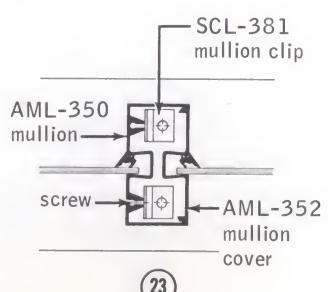
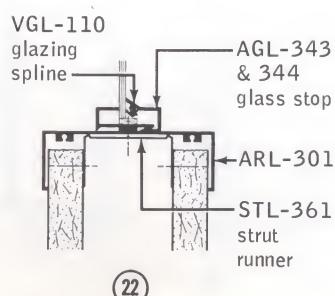
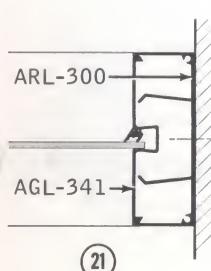
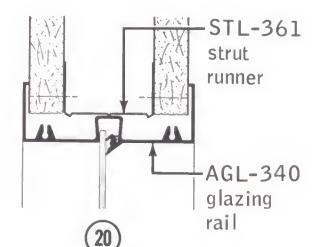
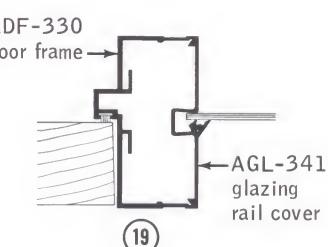
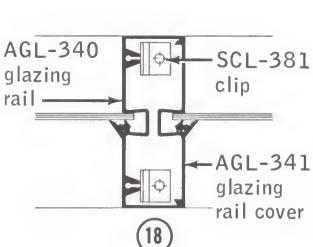
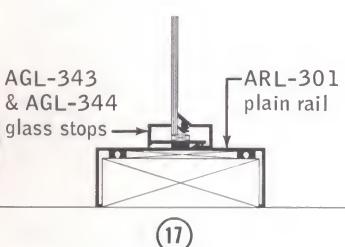
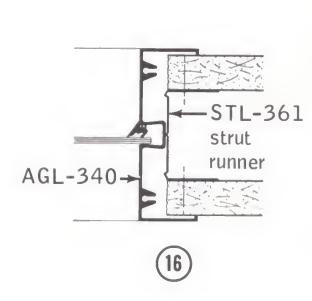
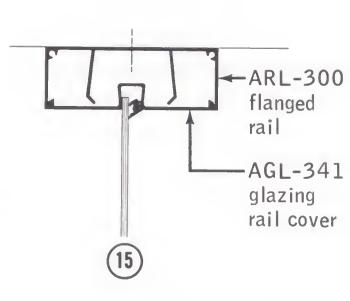
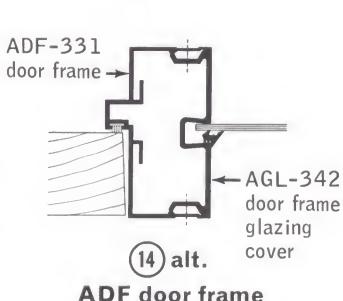
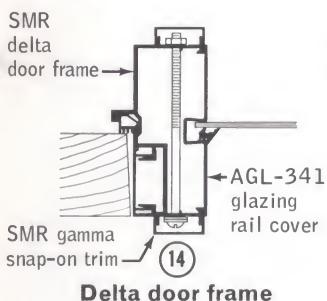
details

ULTRAWALL Movable Partitions

door frames



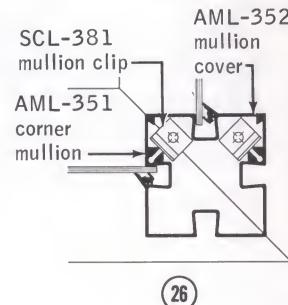
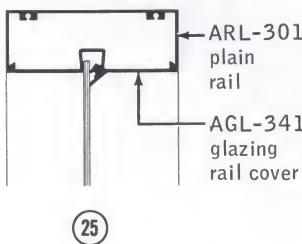
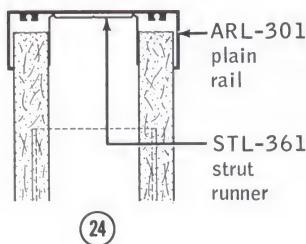
glazing



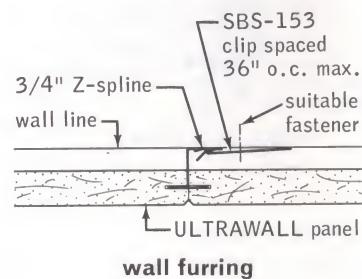
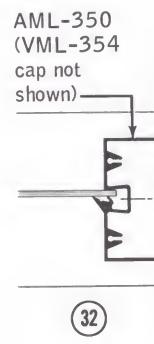
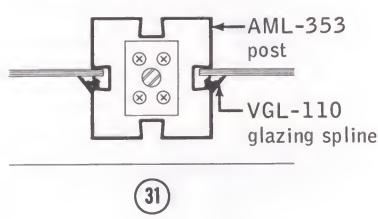
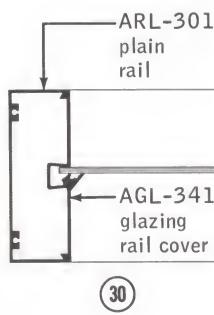
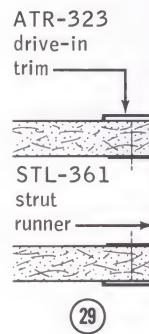
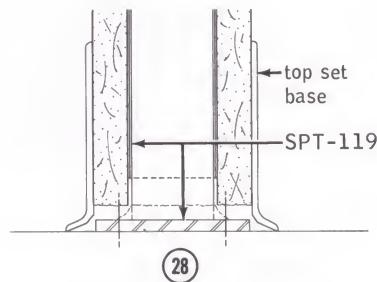
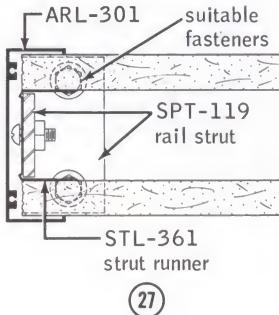
details

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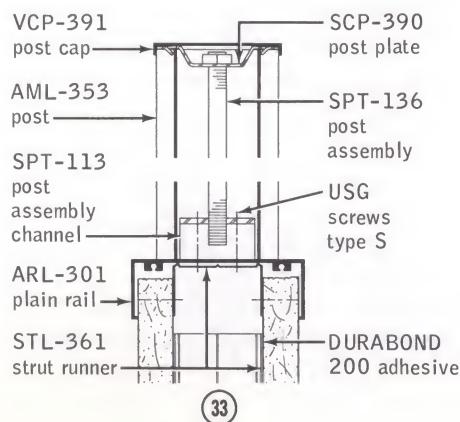
cornice height



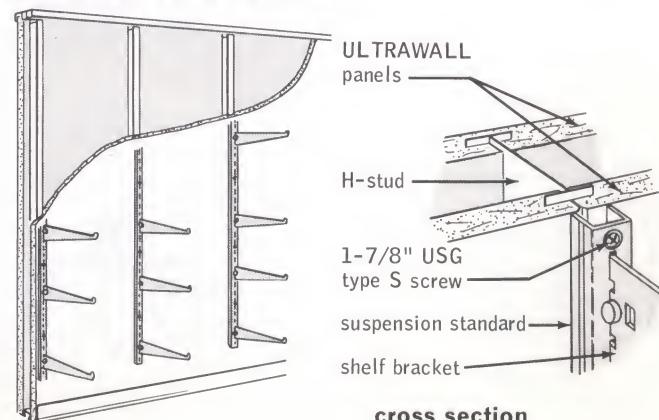
rail height



wall furring cross section



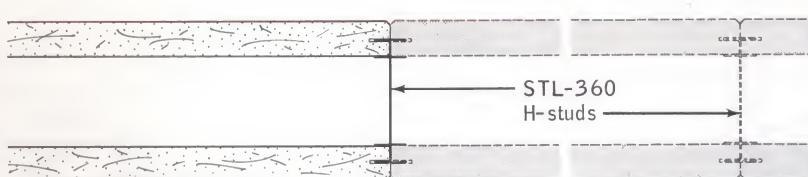
bookcase or shelf attachment



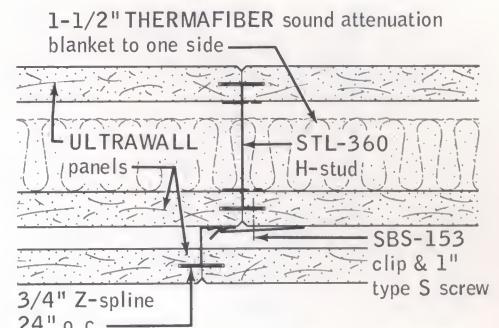
cross section

details—alternate stud systems

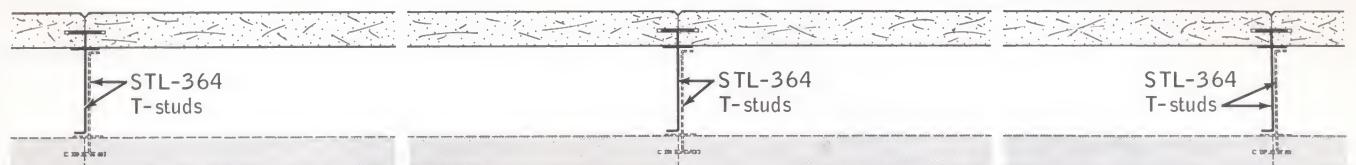
ULTRAWALL Movable Partitions



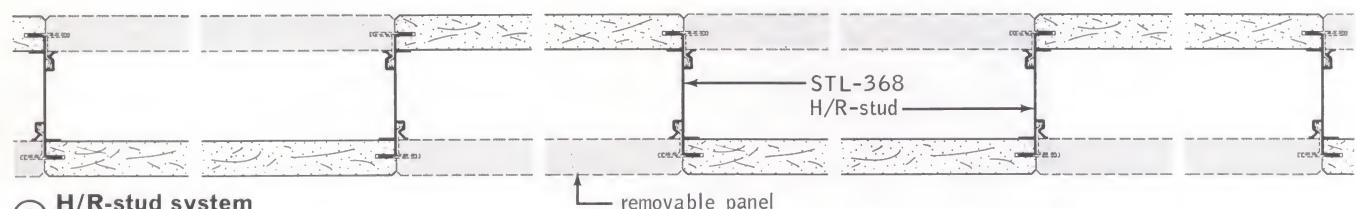
③ standard H-stud system
both sides erected together progressively



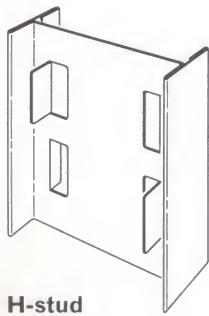
H-stud system sound wall—TL-70-198



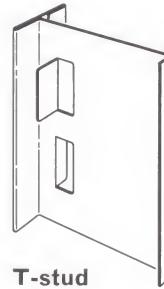
④ T-stud system
each side erected independently



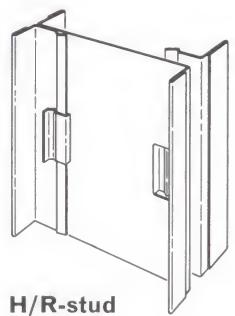
④ H/R-stud system
removable panels



H-stud



T-stud



H/R-stud

fastener load tables

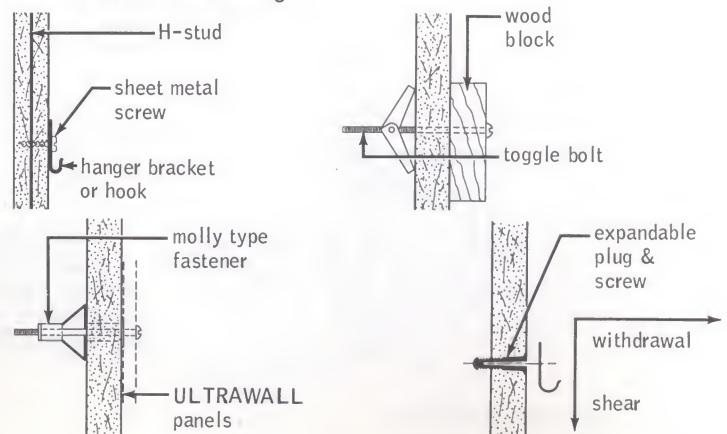
lightweight fixture attachment

type fastener or attachment	allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
no. 8 sheet metal screw into H-stud	50	80
1/4" molly bolt in panel only	35	80
1/4" toggle bolt in panel only	40	60
no. 8 sheet metal screw in plastic plug	20	40

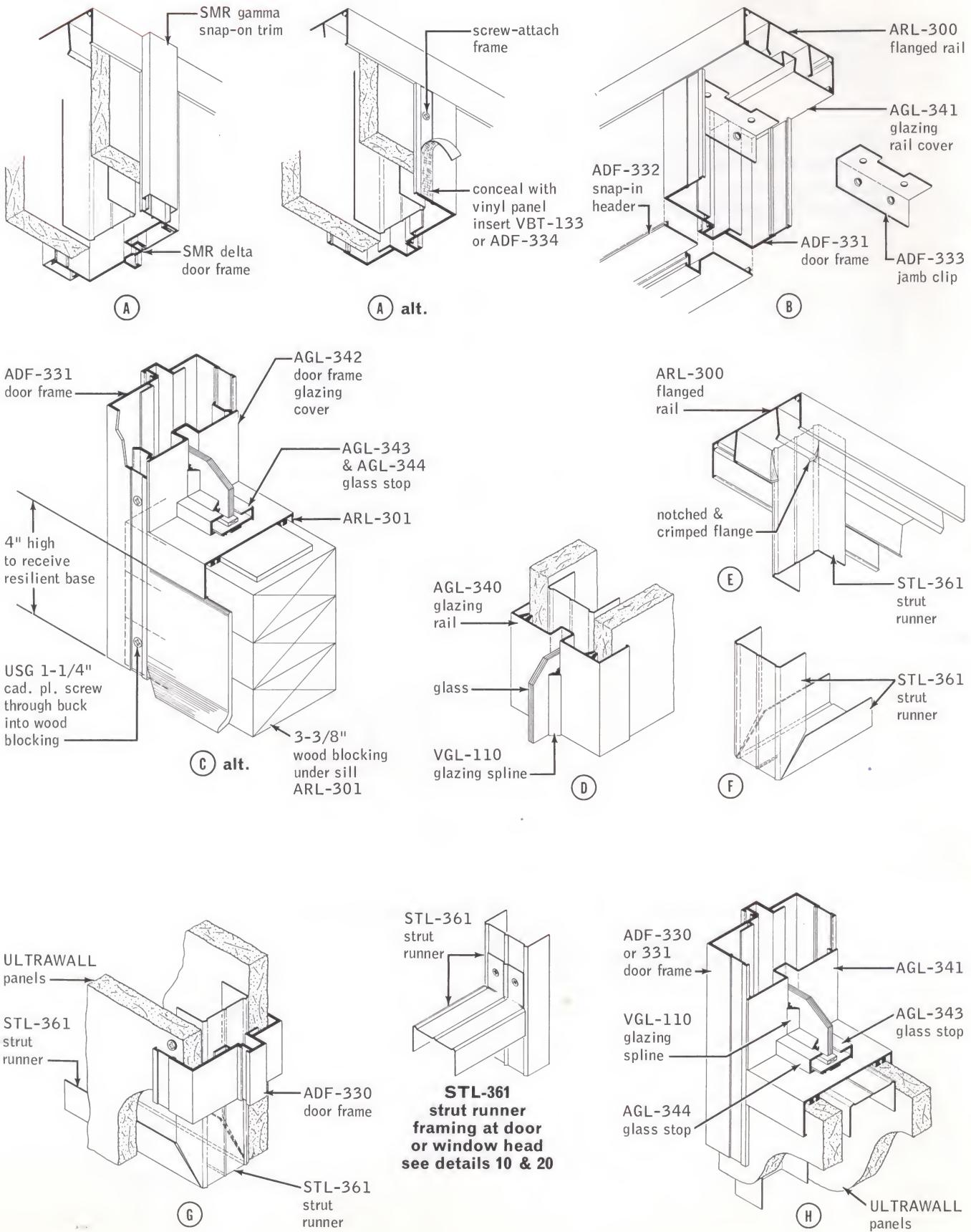
bookcase attachment

bracket system	fastener & spacing	maximum load per bracket
Knape & Vogt Mfg. Co.—brackets 24" o.c.	1 1/4" Type S screw 24" o.c. into H-stud	100 lbs.

fixture attachments—light

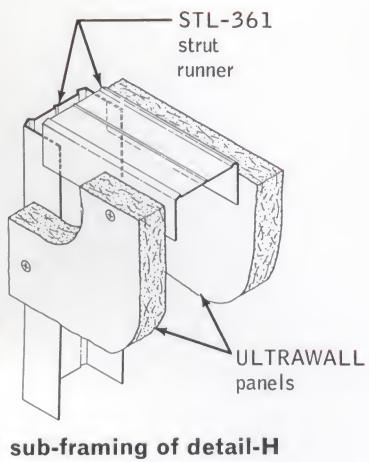


details—H-stud system

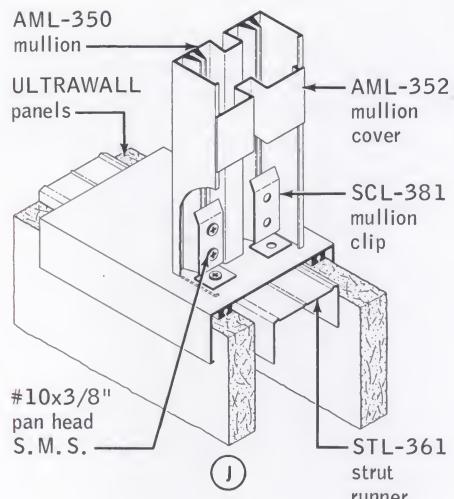


details—H-stud system

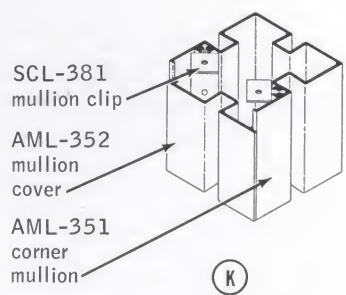
ULTRAWALL Movable Partitions



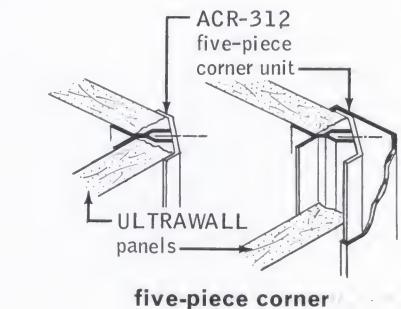
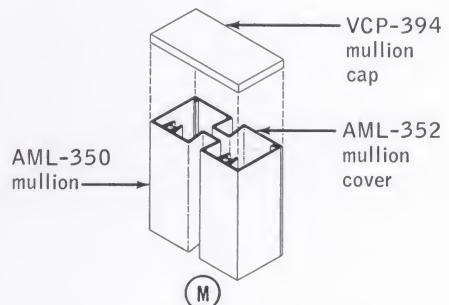
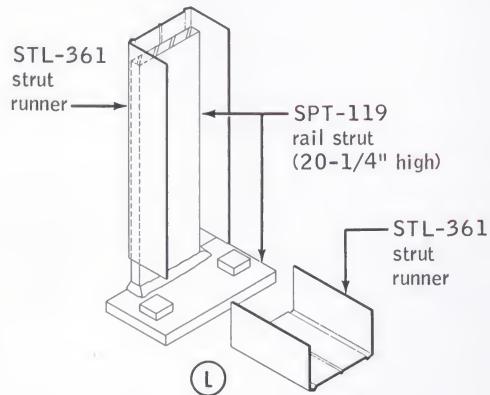
sub-framing of detail-H



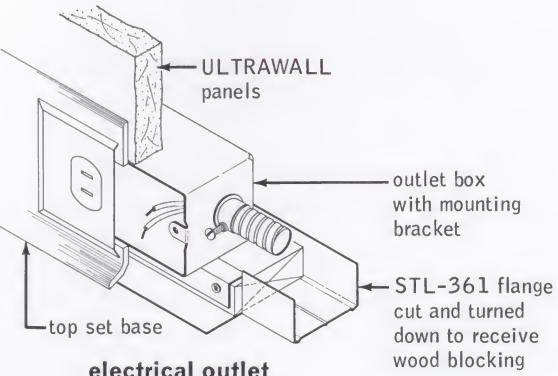
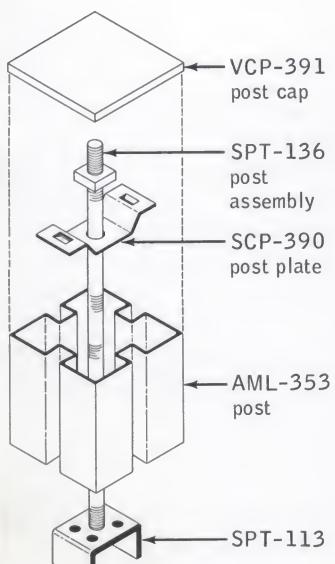
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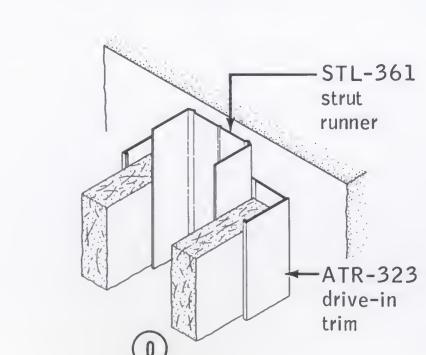
K



five-piece corner



electrical outlet



horizontal rail splice

specifications—notes to architect

1. USG Aluminum Door Frames for ULTRAWALL Partitions are furnished in two styles, two-piece and three-piece, non-reversible and reversible. Both accommodate hollow core and solid core doors in 1 $\frac{3}{4}$ " thicknesses only.

The two-piece non-reversible frame is for ceiling-height openings, furnished with hinges for 3'0"x7'0" door and transom above. Also available with four hinges for ceiling-height door leaves on special order. Ends are cut square. Head is completed with a snap-in door header. Available in 10' height, right or left-hand opening.

The three-piece non-reversible frame is complete with mitered joints for 3'0"x7'0" doors, right or left-hand opening.

Non-reversible frames are supplied with concealed hardware including three 4 $\frac{1}{2}$ "x4" hinges and standard 2 $\frac{3}{4}$ "x1 $\frac{1}{8}$ " strike and strike box (refer to ULTRAWALL Catalog of Components for template dimensions). Ball-bearing hinges are available and should be specified when closers are required; available with four hinges for ceiling-height doors on special order.

The USG SMR Delta Aluminum Door Frame—self-mortising, reversible—is furnished with a snap-in head or milled head and mitered, snap-on trim.

Both reversible frames include snap-in mortise closures, vinyl door mute, aluminum snap-in strike plate, adjustable hinge back-up plates and hinge-attachment screws. Hinges obtained locally.

2. In certain areas where seismic design code requirements govern, consult local building codes for partition limitations.

3. Where this partition is used as a sound barrier, the use of USG Acoustical Sealant to seal all cut-outs, such as at electrical fixtures and to seal all intersections with the adjoining structure is recommended. Eliminate cutting holes back to back and adjacent to each other.

4. The addition of THERMAFIBER Sound Attenuation Blankets to the stud cavity, pressed tightly in place, stapled to the back side of one face of partition, will increase the sound transmission loss of the partition.

5. Fixture Attachment—Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Medium and heavyweight fixtures should be supported from the primary framing.

6. Electrical Fixtures—The depth of electrical boxes should not exceed 2 $\frac{1}{2}$ ". Standard conduit and boxes may be used.

7. See U.S.G. product folders in this series: Paint Products Folder SA-933 for paint specifications, TEXTONE Gypsum Panel Folder SA-928 for vinyl colors and patterns.

Part 1: general

1.1 scope—Furnish and erect ULTRAWALL Partitions as indicated on the plans and specified hereunder.

1.2 description of systems—Partitions shall be flush-panel type, 3 $\frac{3}{8}$ " thick, (railing, cornice, and/or ceiling height).

1.3 qualifications

a. Installation of ULTRAWALL Partitions shall be by a U.S.G.-licensed contractor.

b. All materials included herein, except as noted, shall be supplied by United States Gypsum Company.

1.4 submittals—The partition contractor shall submit shop drawings showing partition construction details.

1.5 delivery and storage of materials—All materials shall be delivered in their original unopened packages. Materials shall be stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products**2.1 materials**

a. **Fire-rated Gypsum Panels**—ULTRAWALL Panels (plain) (vinyl-faced—specify color) 3/4" thick by (24") (30") wide by appropriate height.

b. **Studs**—Roll-formed electro-galvanized steel (one-piece H-stud) (one-piece T-stud) (three-piece H-R stud).

c. **Floor Runners**—Roll-formed electro-galvanized steel to hold panels in alignment.

d. **Ceiling Runners**—One-piece extruded aluminum runner with formed-in spacers, and integral trim to conceal top edges of panels.

e. **Z-splines**—3/4" Z-splines, for attachment of third layer of panels.

f. **Attachment Clips**—SBS-153 Z-spline attachment clips.

g. **Top Set Base**—For adhesive application after panels have been erected and finished. (Base not by U.S.G.)

h. **Door Frames**—USG Aluminum Door Frames (two-piece) (three-piece), (ADF-non-reversible) (SMR-reversible), (color-anodized aluminum—not available in ADF).

i. **Doors**—Wood doors, 1 $\frac{3}{4}$ " thick, 3'0" by 7'0" (left-hand opening) (right-hand opening). (Doors not by U.S.G.)

j. **Window Frames**—Sized as shown on plans and assembled from standard ULTRAWALL extruded aluminum parts. Glass furnished by (partition contractor) (glazing contractor).

k. **Aluminum Trim**—(Exposed members etched and anodized with permanent satin finish) (ULTRABRONZE color-anodized aluminum).

Part 3: execution**3.1 partition erection**

a. **Studs and Runners**—Lay out the partition. Securely attach floor and ceiling runners. Accurately plumb strut studs at door openings and ULTRAWALL terminals.

b. **Gypsum Panels**—Install ULTRAWALL Panels, steel studs and trim members in accordance with United States Gypsum Company's installation directions.

c. **Workmanship**—Erect partitions so as to be rigid, plumb, with horizontal lines leveled, neat in appearance, and free from defects in workmanship. Conceal all connections to walls, floors, ceilings, cornice sections, and connections between gypsum panels. (Adjust all hardware to proper working order.)

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, FIRECODE, THERMAFIBER, ULTRAWALL, TEXTONE, DURABOND, ULTRABRONZE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

SA

1040

VAUGHAN WALLS Gypsum Partitions

Fixed wall appearance, movable partition
flexibility with more design options

system folder



VAUGHAN WALLS, INC.
1975-1

10 P

DEMOUNTABLE PARTITION
gypsum partitions

Monolithic painted wall relieved by full-height doors and an exposed ceiling runner in dark finish sets off soothing color scheme of 2900 Series fixed partitions.



Beauty of function is vividly portrayed in use of wall color and door arrangement in 700 Series installation.

Modular versatility opens more doors to creative interiors—distinctive and durable

VAUGHAN WALLS are high-performance interior gypsum partitions for office, institutional and school buildings that combine the design flexibility of movable walls with permanent wall appearance and service. Developed for modern, functional beauty, VAUGHAN WALLS Partitions offer the advantages of crisp, clean lines and outstanding fire and sound resistance only available in gypsum drywall partitions.

Specially engineered gypsum panels are manufactured by United States Gypsum Company to meet the rigid tolerances and specifications of Vaughan Walls, Inc. The panels are job-laminated and assembled with architecturally designed aluminum extrusions, floor and ceiling runners, door frames and glass sections—the result of years of continual refinement—to provide several basic systems:

700 Series—Movable partitions featuring minimum trim projection and a contemporary low profile appearance. Simplicity and grace make the 700 Series a popular choice. Available in 2½-in. chase wall and 3-in. sound wall.

900 Series—Movable partitions offering projected aluminum trim designed to accentuate door units and glazed walls. The clean, crisp lines of this system have made it the style leader in the industry. Available in 2½-in. chase wall and 3-in. sound wall.

2900 Series—Fixed partitions providing a completely smooth monolithic surface. They also feature the unmatched elegance and clean profiles of 900 Series door frames and glazing extrusions. Competitively priced with conventional drywall, these systems offer design continuity for maximum compatibility with other VAUGHAN WALLS systems. Available in 2½-in. chase wall and 3¾-in. sound wall.

Low Rail Series—Movable partitions with prefinished panels accented by anodized aluminum trim. Ideal for use in bank rails, landscape office planning or as privacy screen for secretarial and clerical pools. Installs quickly over carpet or resilient tile. Available in 2½-in. thick panels (24- or 30-in. wide).

All installations are made by licensed VAUGHAN WALLS contractors, specially trained to provide expert design consultation, prompt installation and fine craftsmanship. Features:

Versatile—Ceiling, door and bank rail heights are available. Glass panels can be used in almost any combination. These highly adaptable units serve every partition need from modular panels with V-joints—for low-cost utility and ready movability—to permanent monolithic walls with custom finishes.

No posts or intermediate studs are used. Door openings may be located anywhere and walls may intersect anywhere to pro-

vide complete freedom in space planning and design. All electrical and telephone services are easily carried within the partitions; outlets may be placed where needed.

Beautiful—All exposed aluminum members are satin-buffed and anodized in rich shades of gray, amber, gold and black. These attractive finishes complement the variety of panel surfaces that may be used.

Surface finish materials include vinyls; $\frac{1}{8}$ -in. wood veneers for smooth, permanent walls; VAUGHAN WALLS WOOD WRAP veneer for movability; paint; or any wallcovering of the decorator's choice.

Design Flexibility—These systems meet virtually all design requirements. Matching walls can be added at any time. Existing wall arrangements can be modified—from ceiling height to cornice or bank rail heights. Door openings and glazing can be added or removed, without special framing, to suit changing light or privacy requirements.

Movable VAUGHAN WALLS Partitions present the sturdy, solid appearance of fixed partitions and easy, prompt mobility on either side for future space requirements. All components are virtually 100% reusable.

Economical—Factory- or job-laminated VAUGHAN WALLS Partitions are ready for immediate installation. There is no expensive inventory needed—all components are supplied as required. Partition cost is usually much less—for the same fire and sound performance—than other movable partitions. Handsome surfaces require little maintenance, take abuse and still look new.

Fire Resistant—Fire-resistance ratings of 1 hour have been established without change in basic construction (see table

page 5). Conformance to building codes is assured, and reduced insurance rates are frequently possible. The 700 Series offers the only aluminum door frame assembly that carries a UL label for Class C fire doors.

Sound Control—These systems create an atmosphere for efficient office performance—maximum privacy for libraries and conference rooms. Versatile VAUGHAN WALLS Partitions with sound ratings ranging from 37 STC to 45 STC (see table page 5), offer more effective sound control than many other movable or permanent partitions. Other sound walls with ratings up to 61 STC are also available.

Dependable—A nationwide network of licensed VAUGHAN WALLS contractors, with locally stocked aluminum components and U.S.G. plants and warehouses strategically located throughout the country, make VAUGHAN WALLS Partitions readily available for fast, reliable delivery. Finish material can be ordered when job is planned—delivered when needed.

limitations

1. VAUGHAN WALLS Partitions are intended for use only as non-load bearing walls.
2. Maximum height is 12 ft. for 700, 900 and 2900 Series partitions; 10 ft. for sound walls.
3. Maximum unsupported run for 700, 900 and 2900 Series less-than-ceiling-height and glazed cornice height partitions is 14 ft.; for Low Rail Series, 8-ft. with freestanding end, 14-ft. with support restraint at both ends.
4. VAUGHAN WALLS Partitions should not be used where normally exposed to moisture or excessive humidity.

Ceiling-height door in combination with full-height clear glass sidelight and low-profile 700 Series trim gives spaciousness and importance to office entry. Richly finished wood bank rail adds effectiveness.



Basic VAUGHAN WALLS Gypsum Partitions

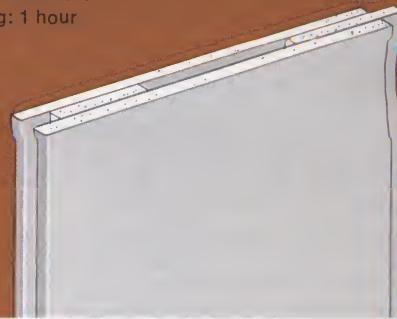
Movable

2½-in. Chase Wall (700 and 900 Series)

Excellent corridor partition or tenant wall preferred when economical chaseways are desired for addition of future electrical requirements. Two layers of specially engineered VAUGHAN WALLS gypsum face panels are laminated to coreboard strips forming a tongue-and-groove panel assembly. Construction provides internal chaseway for electrical and telephone services.

Fire rating: 1 hour

STC: 37



3-in. Sound Wall (700 and 900 Series)

Space-saving party or privacy wall; also used in library and conference rooms. Four layers of VAUGHAN WALLS gypsum panels are laminated to double coreboard strips forming two rows of tongue-and-groove panels. Special sound seals. Either side independently movable so walls can be finished separately. Electrical and telephone services are carried in panel chaseways.

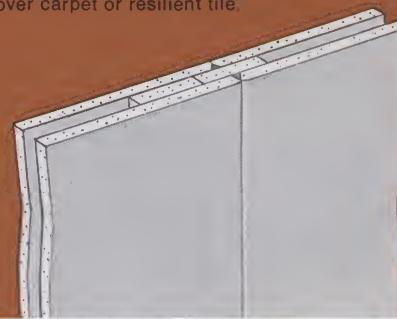
Fire rating: 1 hour

STC: 45



2½-in. Low Rail Partition Series

Factory-fabricated and field-assembled. Entirely self-supporting and easily moved and reassembled. Series consists of 24-in. or 30-in. wide prefinished ¾-in. VAUGHAN WALLS bevel-edge gypsum face panels, laminated to coreboard strips forming a tongue-and-groove panel assembly. Low profile aluminum trim with black inserts in posts for accent. Installed over carpet or resilient tile.



Fixed

2½-in. Chase Wall (2900 Series)

Excellent semi-solid fixed corridor partition or tenant wall where economy and smooth surface are desired; mobility not important. Two layers SHEETROCK FIRECODE gypsum panels laminated in place to coreboard strips. Electrical and telephone services are carried in internal chaseway.

Fire rating: 1 hour

STC: 37

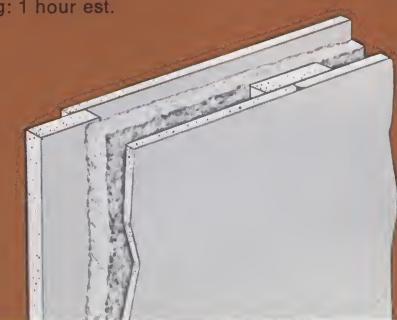


3¾-in. Sound Wall (2900 Series)

Excellent fixed party wall, privacy partition or conference room wall. Two rows of SHEETROCK gypsum panels laminated and stapled to coreboard strips at joints. Neoprene isolators and 1-in. insulation blankets in cavity. Electrical and telephone services are carried in internal chaseway.

Fire rating: 1 hour est.

STC: 45





Unique flexibility at low cost makes Low Rail Partitions ideal for secretarial cubicles, work stations and clerical pools. Entirely self-supporting, no permanent floor connections required. Factory-fabricated to fit modular or random layouts.



Glazed walls give executive office an inviting, open quality. Bronze framing is accented by black ceiling runner which creates visual recess between wall and ceiling.

fire and sound ratings

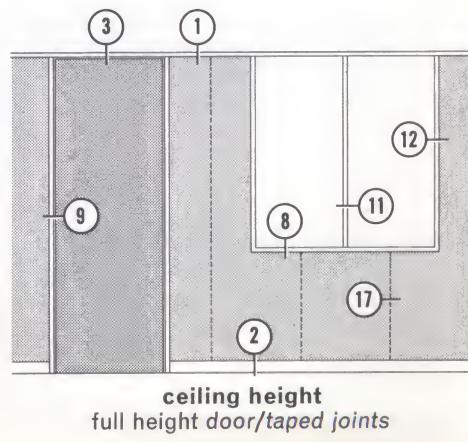
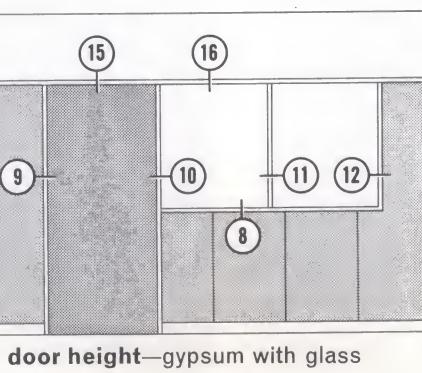
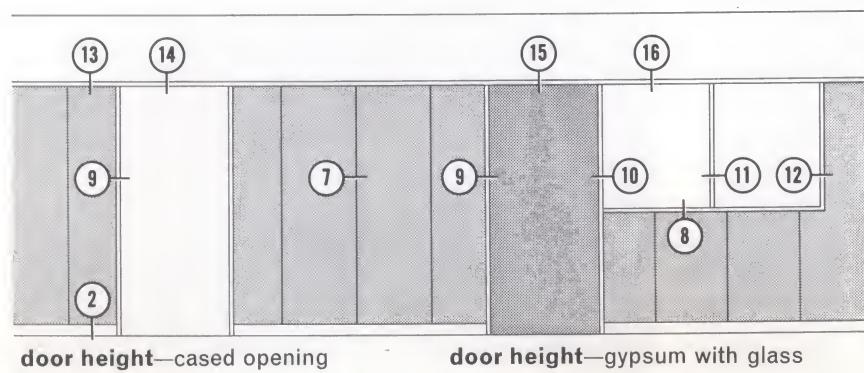
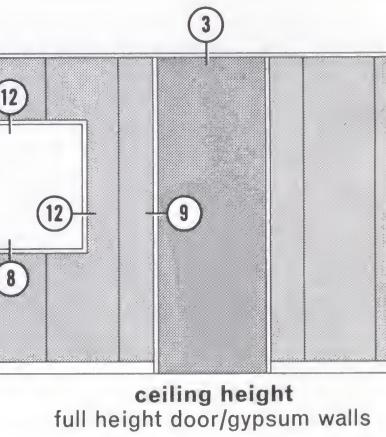
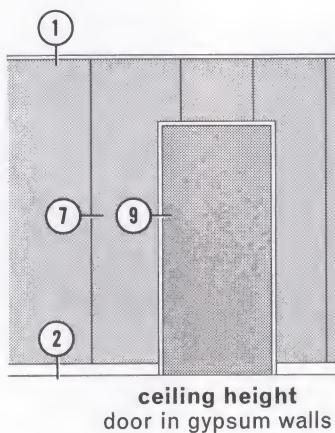
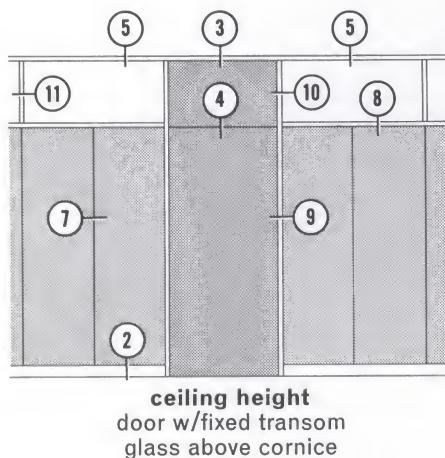
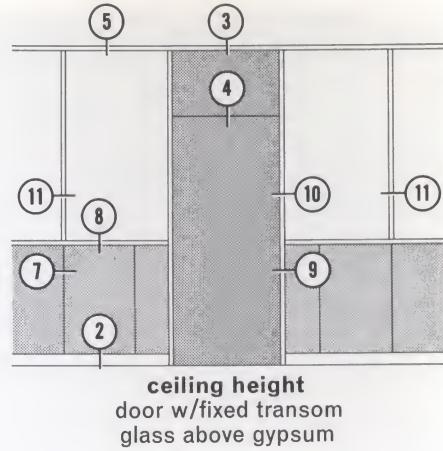
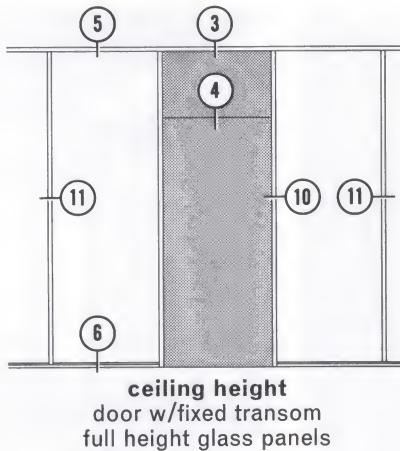
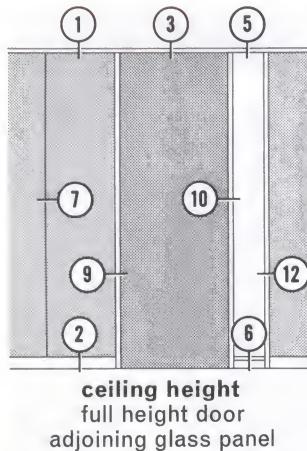
assembly description	test no.	fire rating	STC rating (16-freq.)
Movable VAUGHAN WALLS pre-chased partition 700 and 900 Series—special $\frac{5}{8}$ " USG gypsum face panels laminated to special 1" gypsum core strips placed to form panel joints wt 7 width 2 $\frac{1}{4}$ "	U of C 11-1-66(1) WL-73-59160(2)	1 hr.	37
VAUGHAN WALLS chase wall fixed partition 2900 Series— $\frac{5}{8}$ " SHEETROCK FIRECODE gypsum face panels laminated to special 1" gypsum core strips at vertical joints wt 7 width 2 $\frac{1}{4}$ "	U of C 8-6-71(1) WL-73-59160(2)	1 hr.	37
Movable VAUGHAN WALLS pre-chased sound wall 700 and 900 Series—special $\frac{5}{8}$ " USG gypsum face panels laminated to $\frac{3}{8}$ " gypsum base layer panels— $\frac{1}{2}$ " gypsum core strips placed to form panel joints—2 rows 1 $\frac{1}{2}$ " thick—aluminum trim wt 10 width 3"	U of C 8-12-68(1) WEAL 67-131(3)	1 hr.	45
VAUGHAN WALLS sound wall fixed partition 2900 Series—two rows $\frac{5}{8}$ " SHEETROCK gypsum face panels laminated and stapled to special 1" gypsum core strips at vertical joints—neoprene isolators and 1" insulation blankets in cavity wt 5 width 3 $\frac{3}{4}$ "	WEAL 72-148(3)	1 hr. est.	45

(1) University of California. (2) Wyle Laboratories. (3) Western Electro-Acoustic Laboratory, Inc.

sound transmission loss—db

test no.	method	band center frequency—Hz																		STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000			
WEAL 72-148	Lab	23	26	31	38	43	44	49	50	52	51	52	52	44	44	48	51		45	
WEAL 67-131	Lab	22	27	31	35	39	43	43	45	46	48	47	46	49	52	55	56		45	
WL-73-59160	Lab	24	19	19	27	32	32	36	37	40	41	42	41	38	38	39	41		37	

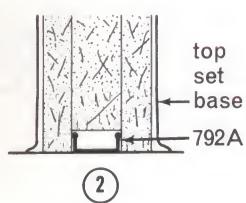
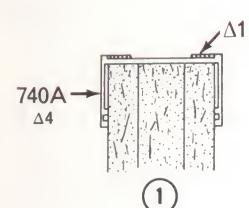
elevations



details/2½" chase wall (700 series)

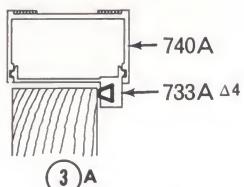
VAUGHAN WALLS

scale: 3" = 1'-0"

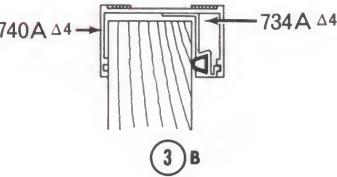


②

③ choice of a or b



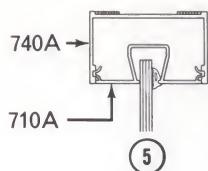
③ A



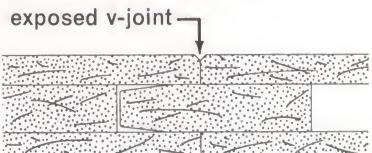
③ B



④

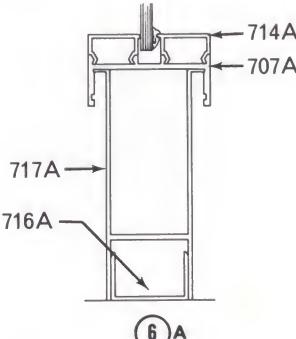


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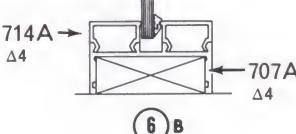


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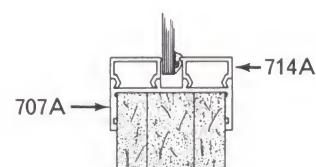
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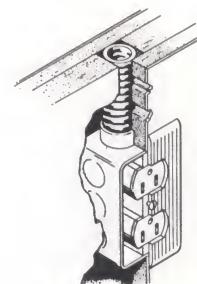
⑥ A



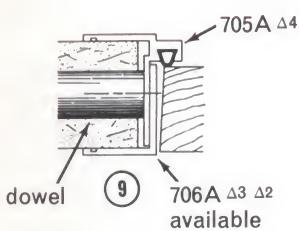
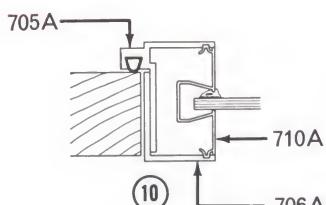
⑥ B



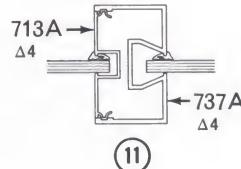
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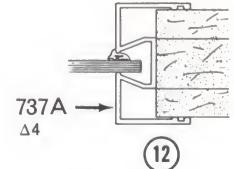
electrical outlet

dowel
⑨
706A Δ3 Δ2 available

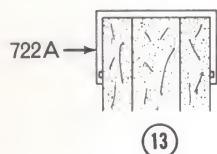
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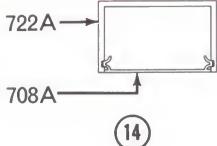


⑫



722A

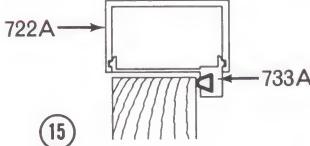
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722A

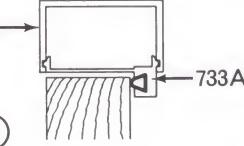
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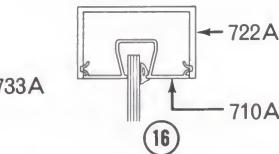
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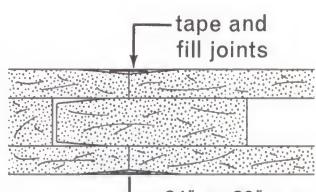
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⑯



722A

⑯



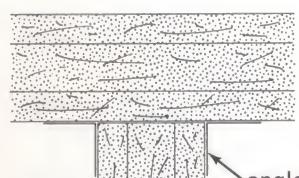
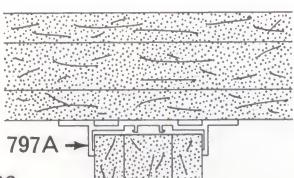
tape and fill joints

24" or 30" o.c.

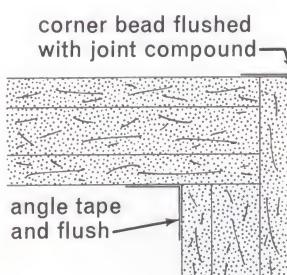
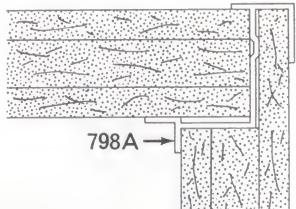
⑰

1 Hr.—U of C 11-1-66

wall intersections and corners (700 and 900 series)

angle tape and flush
painted panels (joints treated)

vinyl panels

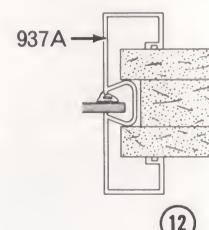
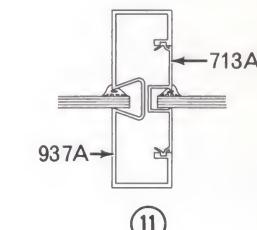
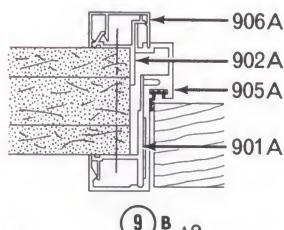
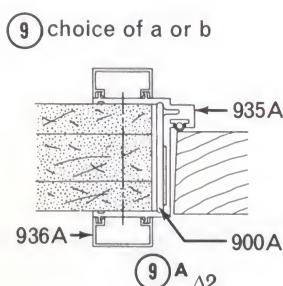
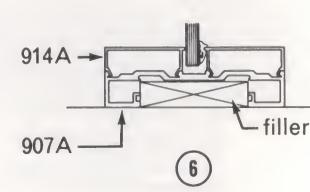
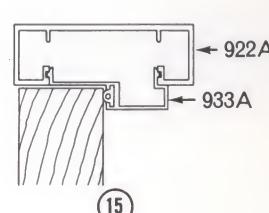
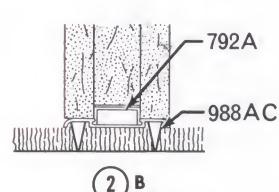
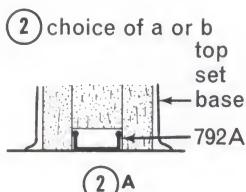
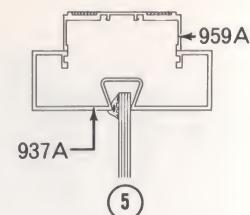
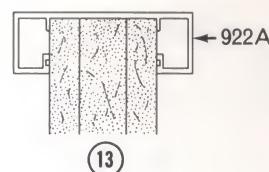
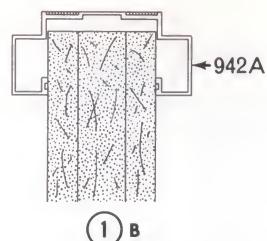
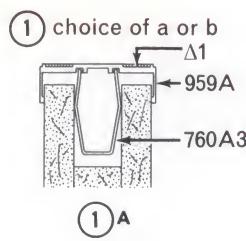
angle tape and flush
painted panels (joints treated)

vinyl panels

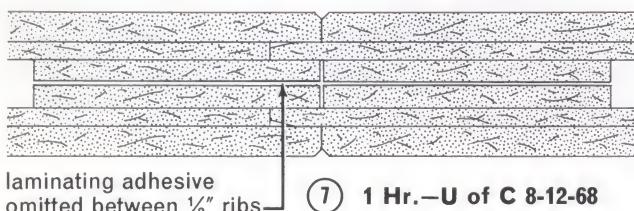
Δ1—1/8" Polyurethane Gasket
Δ2—30-min. ICBO ApprovalΔ3—45-min. Underwriters "C" Label
Δ4—Also available for 3" sound wall

details/2½" chase wall (900 series)

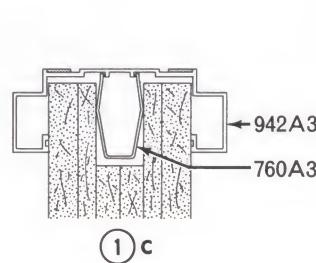
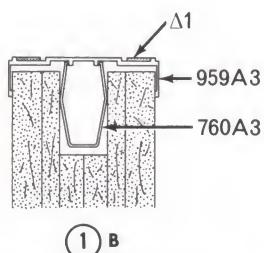
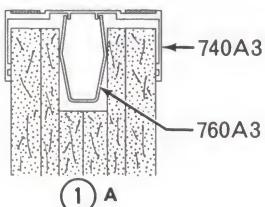
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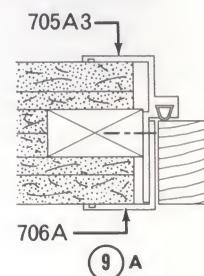
details/3" sound wall (700 and 900 series)



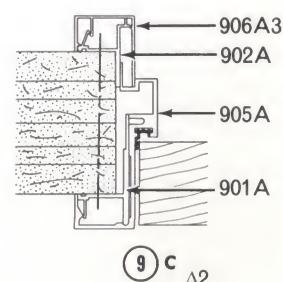
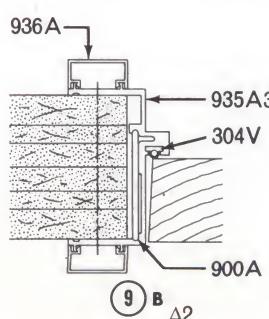
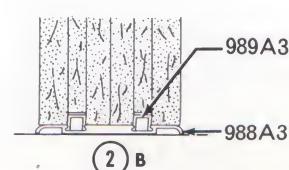
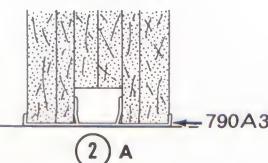
① choice of a, b or c



⑨ choice of a, b or c



② choice of a or b

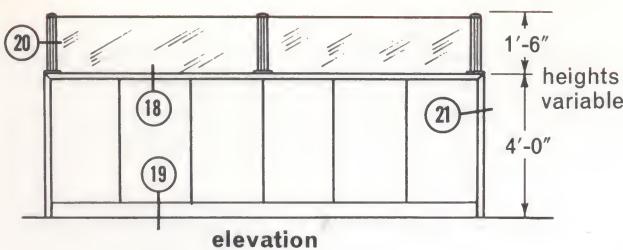


Δ1—1/8" Polyurethane Gasket
Δ2—30-min. ICBO Approval

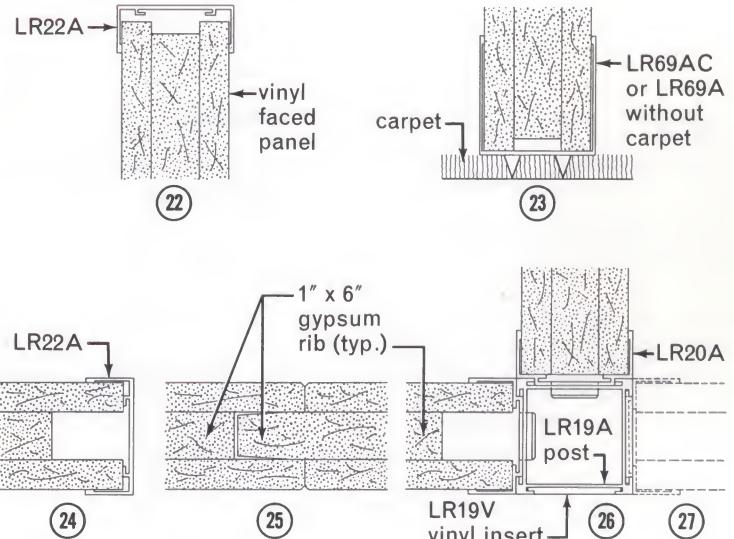
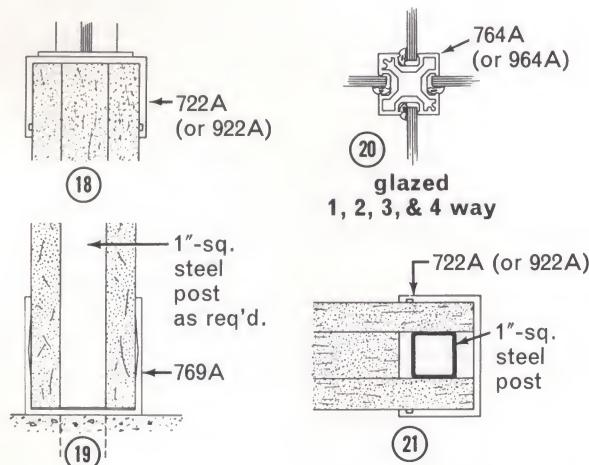
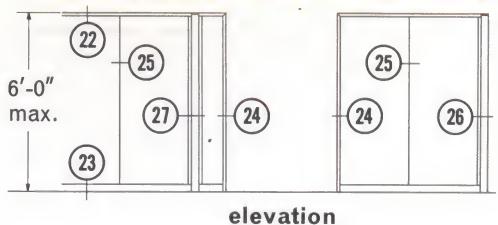
See page 7 for other 3" sound wall profiles

details/bank rail partition (700 and 900 series)

VAUGHAN WALLS

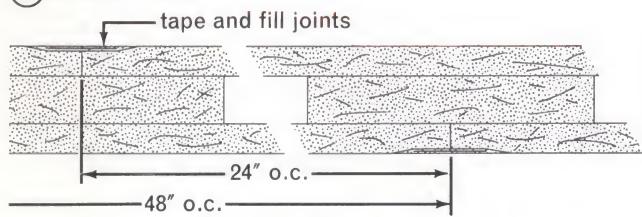


details/low rail partition series

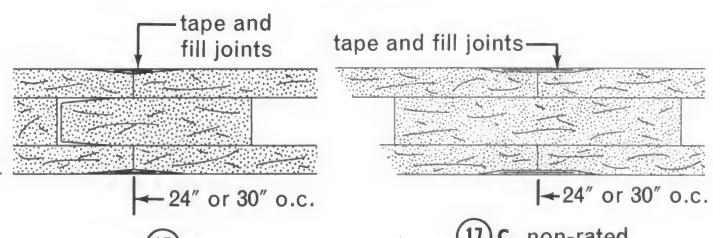


details/2 1/4" chase wall (2900 series)

(17) choice of a, b or c

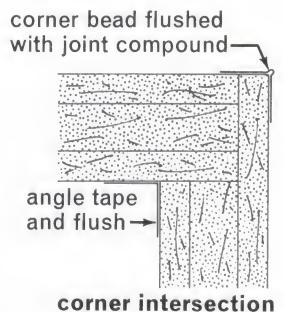


(17) A 1 Hr.-U of C 8-6-71

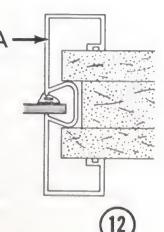
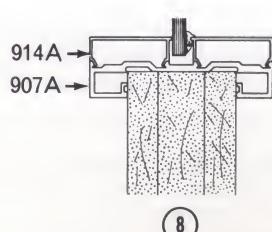
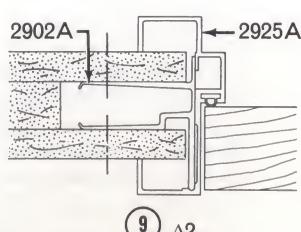
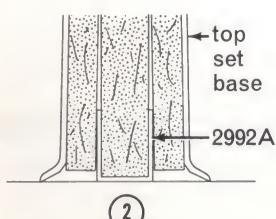
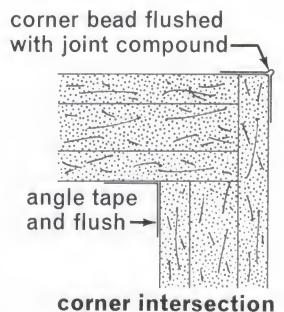
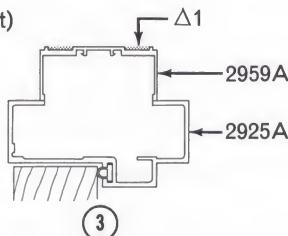
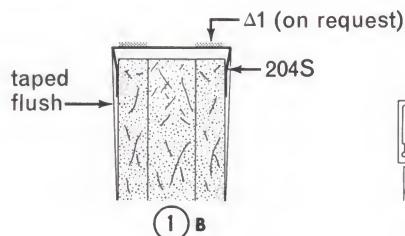
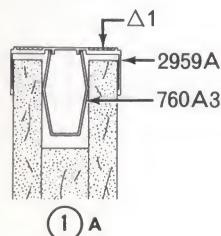


1 Hr.-U of C 11-1-66

(17) C non-rated



(1) choice of a or b

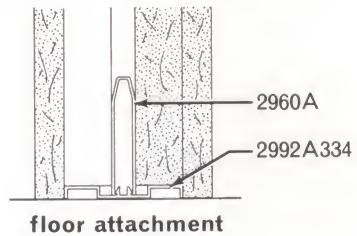
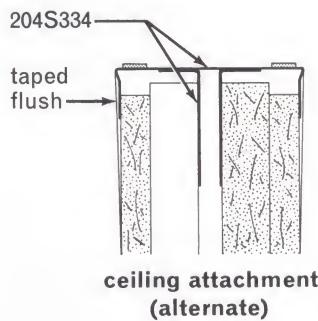
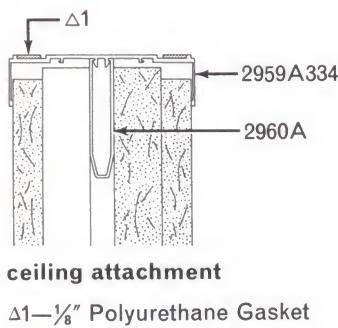
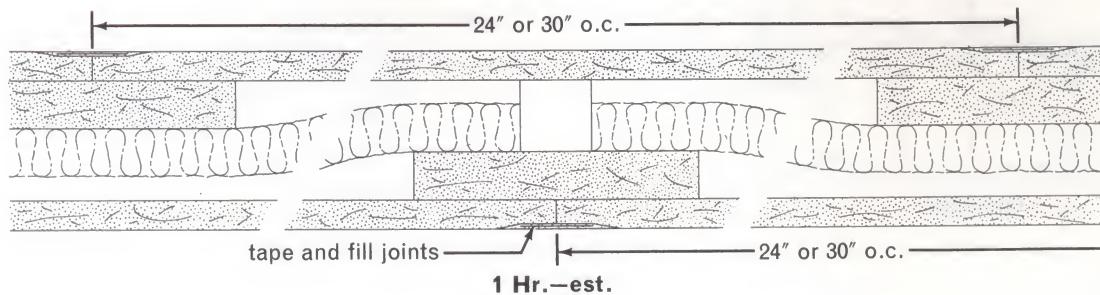


Δ1-1/8" Polyurethane Gasket

Δ2-30-min. ICBO Approval

details/3½" sound wall (2900 series)

scale: 3" = 1'-0"



specifications

notes to architect

1. The standard finish for exposed VAUGHAN WALLS Aluminum Components includes a C1 directional polish, unless specifically excluded. Standard finishes are described in Part 2. Available finishes, which may be substituted as required, are: (1) V01 clear anodized, (2) V11 light bronze anodized, (3) V12 medium bronze anodized, (4) V13 dark bronze anodized, (5) V35 black anodized, (6) baked enamel.

Unexposed surfaces: mill finish. Tolerances: commercial.

2. Any fabric-backed vinyl and many burlap and grass fabrics can be wrapped on VAUGHAN WALLS movable panels at the factory or job site.

3. VAUGHAN WALLS Partitions are suitable for lightweight fixture attachment. Consult your VAUGHAN WALLS contractor for specific type of bracket recommendation.

The most expedient way to obtain additional information on fire ratings, sound transmission or details not covered in this publication is to direct inquiries to Vaughan Walls, Inc., 11681 San Vicente Blvd., Los Angeles, Calif. 90049, a Vaughan Walls licensed contractor or United States Gypsum sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.1.1 work included

The partition contractor shall furnish all labor, materials and equipment necessary to complete all VAUGHAN WALLS installations: laminated gypsum panels, aluminum components, glass sections, door frames, floor and ceiling runners. Contractor shall also furnish and install wood doors, wood veneers, vinyl wall covering, glass and glazing as may be required to complete the installation.

1.1.2 work not included

- Ceilings.
- Painting.
- Electrical.
- Top set base.
- Finish hardware.

1.2 description of systems

VAUGHAN WALLS Gypsum Partitions shall be:

- Movable Chase Wall, 2½" thick, with (700)(900) Series aluminum components. The assembly shall have a 1-hour fire rating in accordance with U of C 11-1-66 and a sound rating of 37 STC in accordance with WL-73-59160.

- Movable Sound Wall, 3" thick, with (700)(900) Series aluminum components. The assembly shall have a 1-hour fire

rating in accordance with U of C 8-12-68 and a sound rating of 45 STC in accordance with WEAL-67-131.

c. **Movable Low Rail Wall**, 2 $\frac{1}{4}$ " thick, with anodized aluminum components. Specify color as listed in Notes to Architect, No. 1.

d. **Fixed Chase Wall**, 2 $\frac{1}{4}$ " thick, with 2900 Series aluminum components. The assembly shall have a 1-hour fire rating in accordance with U of C 8-6-71 and a sound rating of 37 STC in accordance with WL-73-59160.

e. **Fixed Sound Wall**, 3 $\frac{3}{4}$ " thick, with 2900 Series aluminum components; cellular neoprene isolators and 1" insulation blankets in the partition cavity. The assembly shall have a sound rating of 45 STC in accordance with WEAL-72-148.

1.3 qualifications

All VAUGHAN WALLS Partitions shall be installed by a VAUGHAN WALLS Licensed Contractor employing skilled craftsmen under close supervision of experienced foremen who have received on-the-job training by Vaughan Walls, Inc.

1.4 submittals

Partition contractor shall submit to the architect detail drawings of all metal components showing attachments to adjacent work and to each other in compliance with the preceding General Conditions.

1.5 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.6 environmental conditions

Temperatures within the building shall be above a constant minimum of 55°F during lamination and erection of partition panels. When required, heat shall be furnished by (building owner) (general contractor). Erection of partition panels shall not begin until erection of exterior walls and glazing or temporary covering of exterior openings provide complete protection from outside weather.

Part 2: products

2.1 partition panels—laminated to form nominal (24") (30") wide panels as specified below:

a. **Movable Chase Wall Panels**—semi-solid, job-laminated VAUGHAN WALLS 1" x 6" nom. Gypsum Coreboard strips spaced (12") (18") apart and faced both sides with $\frac{5}{8}$ " VAUGHAN WALLS (regular) (FIRECODE) Gypsum Panels.

b. **Movable Sound Wall Panels**—two rows $\frac{5}{8}$ " VAUGHAN WALLS (regular) (FIRECODE) Gypsum Panels laminated to $\frac{5}{8}$ " VAUGHAN WALLS Gypsum Coreboard with $\frac{1}{2}$ " x 6" Gypsum Coreboard strips laminated to backing board at panel joints.

c. **Movable Low Rail Panels**— $\frac{5}{8}$ " VAUGHAN WALLS bevel-edge gypsum panels factory- or job-laminated to both sides of 1" x 6" nom. gypsum coreboard strips.

d. **Fixed Chase Wall Panels**—semi-solid, $\frac{5}{8}$ " SHEETROCK (regular) (FIRECODE) Gypsum Panels laminated-in-place to both sides of 1" x 6" (nom.) Gypsum Coreboard strips.

e. **Fixed Sound Wall Panels**—two rows $\frac{5}{8}$ " SHEETROCK Gypsum Panels, 30" wide, laminated and stapled to one side of 1" x 6" (nom.) Gypsum Coreboard strips at panel joints.

2.2 adhesive—VAUGHAN WALLS Brand W-300 Non-flammable Adhesive, VAUGHAN WALLS WR 2900 Adhesive or VAUGHAN WALLS Contact Adhesive.

2.3 metal components—manufactured to standards approved by Vaughan Walls, Inc.

a. Aluminum Extrusions

Material: Revere 5010 or 6063-T5 aluminum alloy.
Nom. thickness: .125", except glazing closure plates may be combination .094" and .125".

Unexposed surfaces: mill finish.

Tolerances: commercial.

b. Aluminum Door Frames—factory-mortised, reinforced, drilled and tapped for mortised hardware according to templates furnished by hardware supplier. Reinforced for surface-applied hardware as required.

2.4 finishing accessories—reinforcing tape, joint compounds and metal corner beads as manufactured by United States Gypsum Company or equal.

2.5 panel finishes

a. **Wood**—($\frac{1}{8}$ " architectural veneer) (VAUGHAN WALLS WOOD WRAP Veneer pre-wrapped on face panels). (Specify type of finish desired.)

b. **Vinyl**—Vinyl wallcoverings as selected from VAUGHAN WALLS or TEXTONE Panel sample books (wrapped on face panels at job site prior to erection) (factory-applied to face panels) (applied as a smooth continuous surface after face panel erection).

c. **Other Wallcoverings**—(Specify type desired.)

d. **Paint**—One coat of SHEETROCK Sealer, and one coat of GRAND PRIZE Acrylic Latex Paint or one coat of flat oil paint, or equal.

2.6 post insert—Black rigid vinyl (for Low Rail Series).

Part 3: execution

3.1 installation

a. **Partitions**—Lay out partitions accurately and securely anchor floor and ceiling runners. Such attachment shall assure complete security of the partition and future removal (and relocation) without excessive damage to the floor or ceiling construction.

b. **Gaskets**—Install polyurethane gaskets between all ceiling runners and ceiling materials.

c. **Partition Panels (700 or 900 Series)**—Form and laminate in special jigs to insure a constant dimension at the tongue and groove. Offset coreboard from face panels to form a tongue and groove 1 $\frac{1}{2}$ " deep. Install panels in floor and ceiling runners to form tight joints with true vertical and horizontal alignment.

d. **Partition Panels (2900 Series)**—Install face panels vertically between floor and ceiling runners. Laminate panels in place to both sides of coreboard strips spaced (24") (30") o.c. For sound walls, laminate panels to one side of coreboard strips spaced 30" o.c. Center face layer joints over strips and stagger joints on opposite partition sides. Fasten face panels to strips with staples spaced 18" o.c. In sound walls, install 1" insulation in the cavity butting ends and edges closely together and filling all voids.

e. **Partition Panels (Low Rail Series)**—Stand four-way posts at intersections. Hook aluminum base, pre-punched for carpet thickness, into posts and press into carpet; do not permanently secure. For perpendicular walls and tile floors, attach base with double-faced tape. Hook aluminum channels for partition intersections onto four-way post. Lift panel closest to post into base and slide into channel. Install balance of

panels progressively. Install continuous cap over panels and attach with concealed angle clips. At partition terminals, trim ends with mitered section of aluminum cap running to floor. Slide rigid black vinyl inserts into open side of four-way posts and press square caps onto top of posts.

f. **Aluminum Door Frames**—Assemble frames plumb and square. Fasten 700 Series frames with screws into 1" x 4" long dowels set into coreboard. Screw-attach 900 and 2900 Series frames through the panels. Anchor bottom of frames to floor runner.

g. **Extrusions**—Use maximum length sections and install splice plates and angles as detailed to reinforce all connections. Cut ends and miters accurately and clean to fit adjacent parts neatly.

h. **Joint Compound**—Apply to beveled joints of panels, to

insure proper bridging or paint. Wipe excess cement from joint, leaving a true "V" bevel.

i. **Metal Corner Bead**—Install at all external corners, where aluminum extrusions are not installed. Apply at least two coats of joint compound over beads and feather each coat out onto panel face.

j. **Tape and Joint Compound**—Apply according to manufacturer's directions to all internal corners and intersections where flush finishing is desired or metal trim is not specified.

k. **Electrical Outlets**—Position outlets as detailed; coordinate with the electrician.

l. **Finishes**—Apply wood veneer and vinyl wallcovering using adhesive approved by Vaughan Walls, Inc. Apply paint according to manufacturer's directions.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, FIRECODE, GRAND PRIZE, SHEETROCK, TEXTONE. VAUGHAN WALLS is Reg. U.S. Pat. Off. by Vaughan Walls, Inc.

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UNITED STATES GYPSUM 101 South Wacker Drive, Chicago, Illinois 60606
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